



Chatbots & Extension

Are they the new virtual agent?

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What is a chatbot?

- Chatbots are computer programs that mimic conversation via text-to-text or text-to-chat methods.
- They can automate tasks to reduce the friction and streamline activities in our daily lives.
- They can be conversational, engaging, and personal.

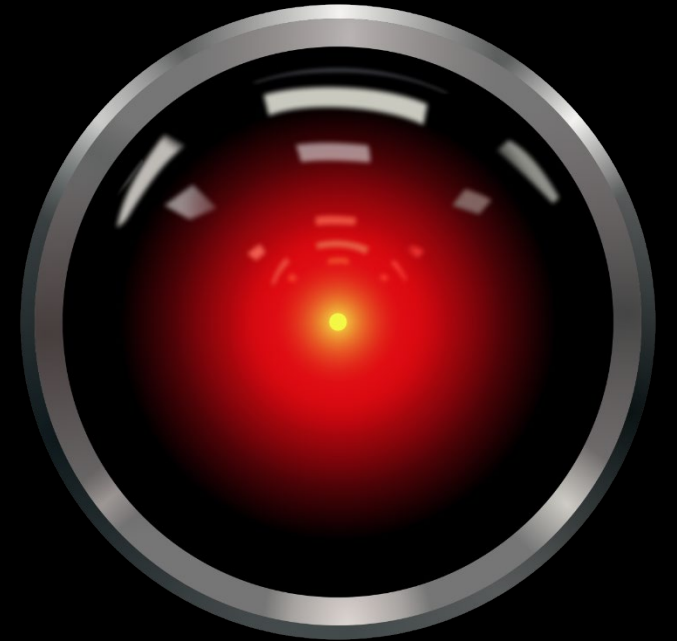


There are two primary programming styles for chatbots.

Retrieval based (ask it a question it looks up the answer)

OR

Generative (uses AI to get smarter as it learns from commands)



There are 7 categories of chatbots (chatterbots):

1. The Optimizer - largest category (all others are spinoffs)
2. One-Trick Pony - (adding sunglasses to a photo)
3. The Proactive – provide right info at the right time (“Weathercat Poncho”)
4. The Social – Slack bots (use crowd/messenger platforms)
5. The Shield – help you avoid unpleasant experiences (fight bureaucracy, “DoNotPay” bot)
6. The Chatty – only exist for the sake of conversation
7. The Super Bot – Alexa, Siri, Cortana: intelligent personal assistants



The first chatbot, Eliza, mimicked psychotherapy-based conversations.

- Developed as a satire of psychotherapy by MIT researcher Joseph Wizenbaum who wanted to show the superficiality of therapy.
- Eliza was a “Chatty” bot to which people quickly bonded.

Eliza Chat bot

**Is she a Rogerian
psychotherapist,
a semi intelligent chat bot,
or just a toy?**



Eliza, one of the original chat bots, is now ready to talk to you.

She is programmed to behave as a Rogerian psychotherapist, and is an interesting example of the limitations of early artificial intelligence programs.

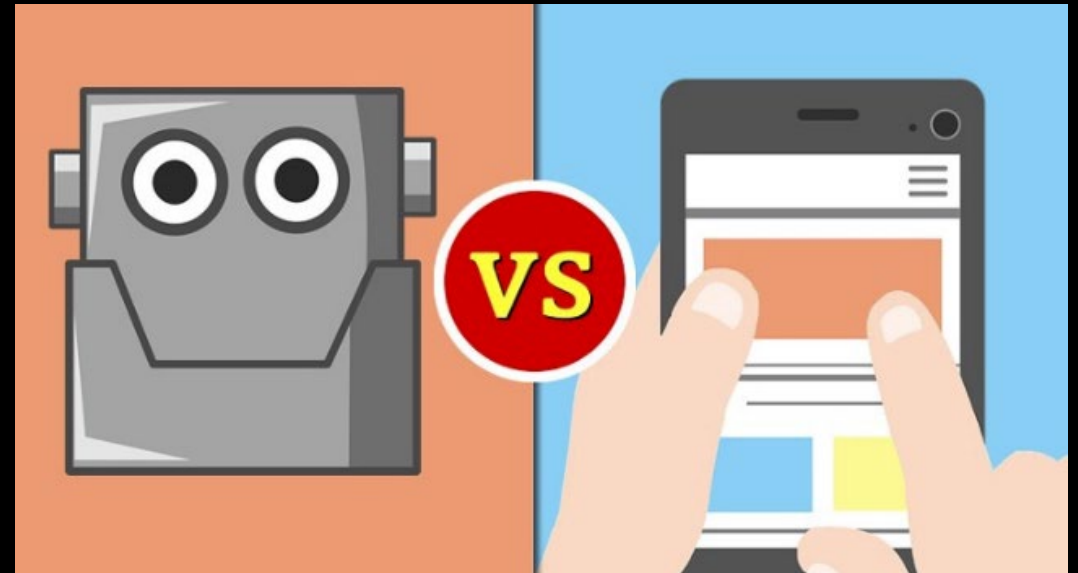
SIRI was originally designed as an app for all mobile phones, not just Apple.

- Developed by an AI center, SRI international as an app then sold to Apple in 2010.
- “Superbot” chatbot and virtual assistant.
- First bot with personality, uses machine learning to function.



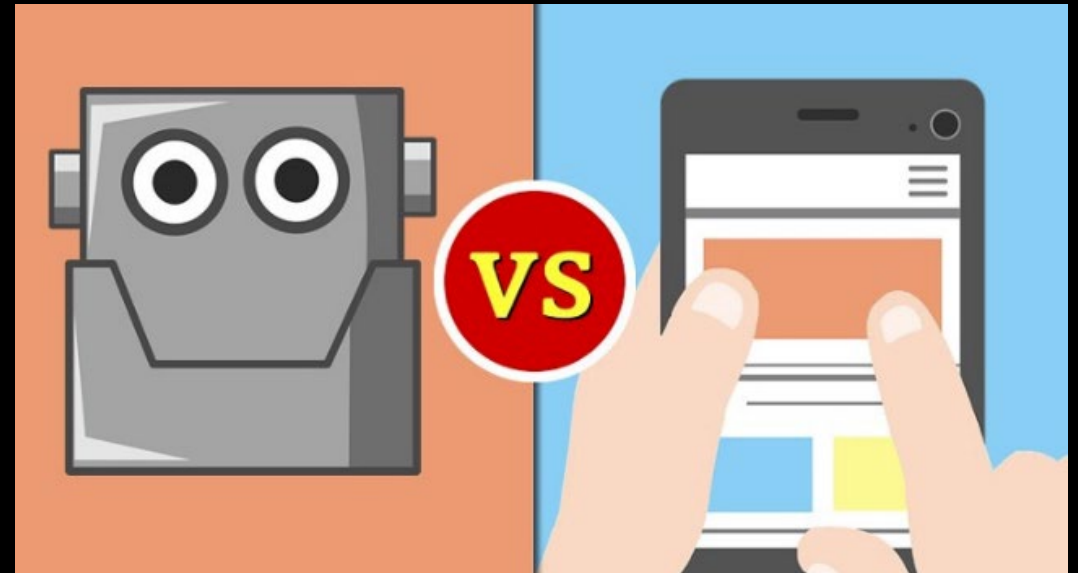
Why develop a bot instead of an app?

- Chatbots meet the client where they are.
- Chatbots do not have to be updated to comply with a certain platform.
- Non-tech savvy people can build one!
- Bots could potentially replace/support employees as triage support for general questions.

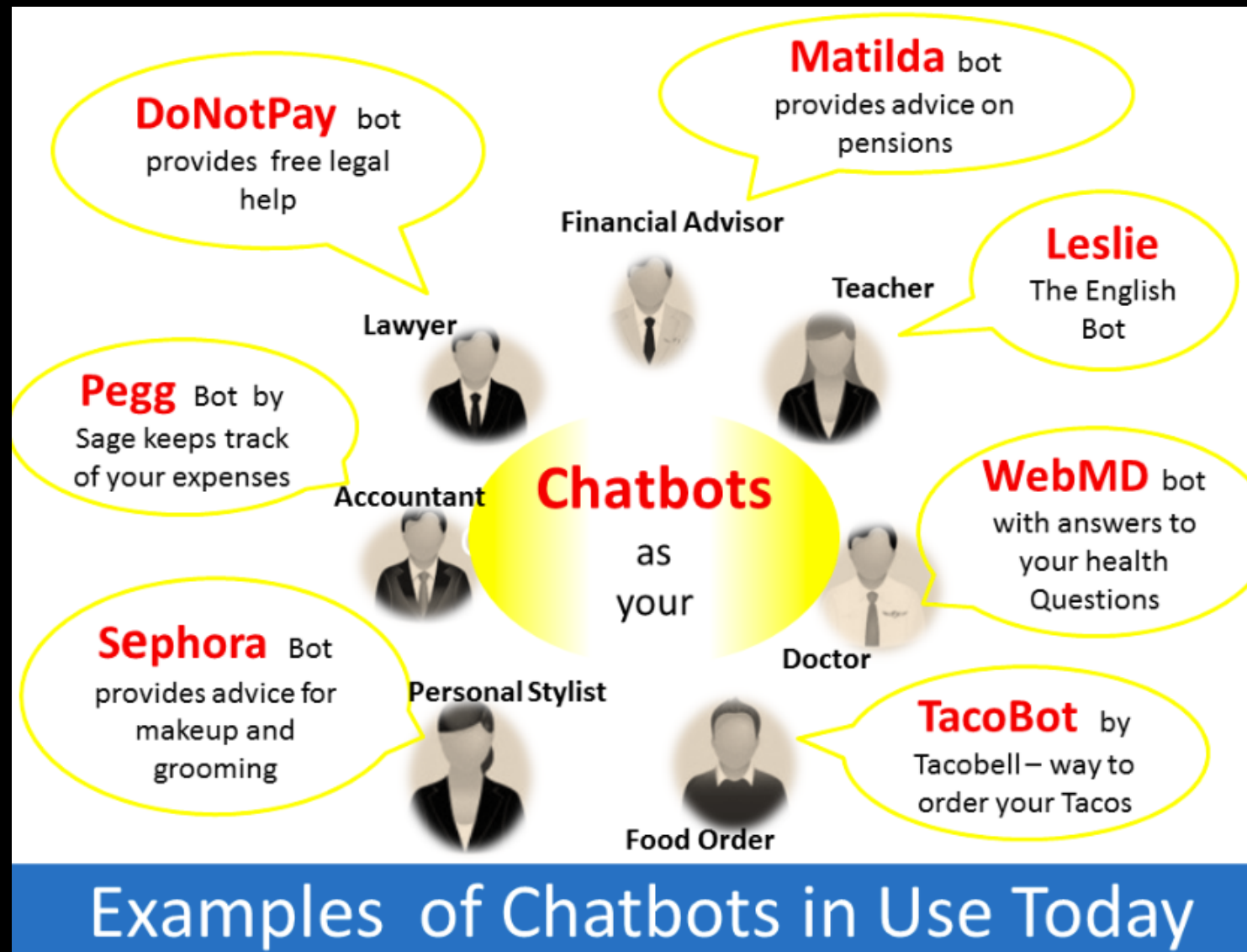


Reasons why app development may not be ideal:

- App fatigue. Average users only access 9-10 apps daily.
- It's hard to get noticed in a busy app marketplace.
- Subjective platforms: hardware, UI changes, payment requirements, etc.
- Who has time and resources to maintain apps?



Most for-profit industries use chatbots.



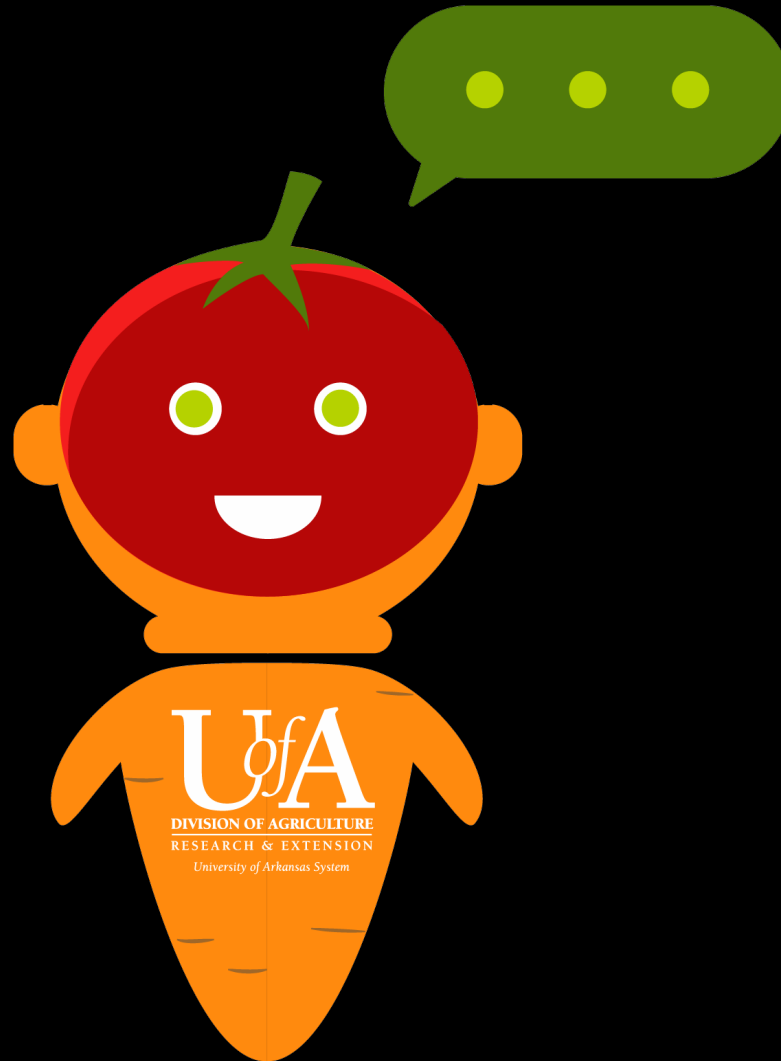
Examples of how industries use chatbots:

- **Sales** – browse and purchase items using a chat feature with no human interaction.
- **News** – users navigate questions via a chatbot to customize their view
- **Travel** – bots can assist with pricing, book flights, update users with weather and travel delays
- **Banking** – finding out balances, transfer money, answer basic questions
- **Healthcare** – answer common questions and locate professionals. This is similar to how Extension can utilize bots!

Build your own chatbot, just like we did!

- Snatchbot: <https://snatchbot.me/> (easy setup, no programming knowledge needed)
- Dialogflow (Google): <https://dialogflow.com/> (better with AI, more technical)
- Flowxo <https://flowxo.com/>
- PandoraBots <https://www.pandorabots.com/>
- Motion <http://www.motion.ai/>

VeggieBot: Our Extension Bot Journey

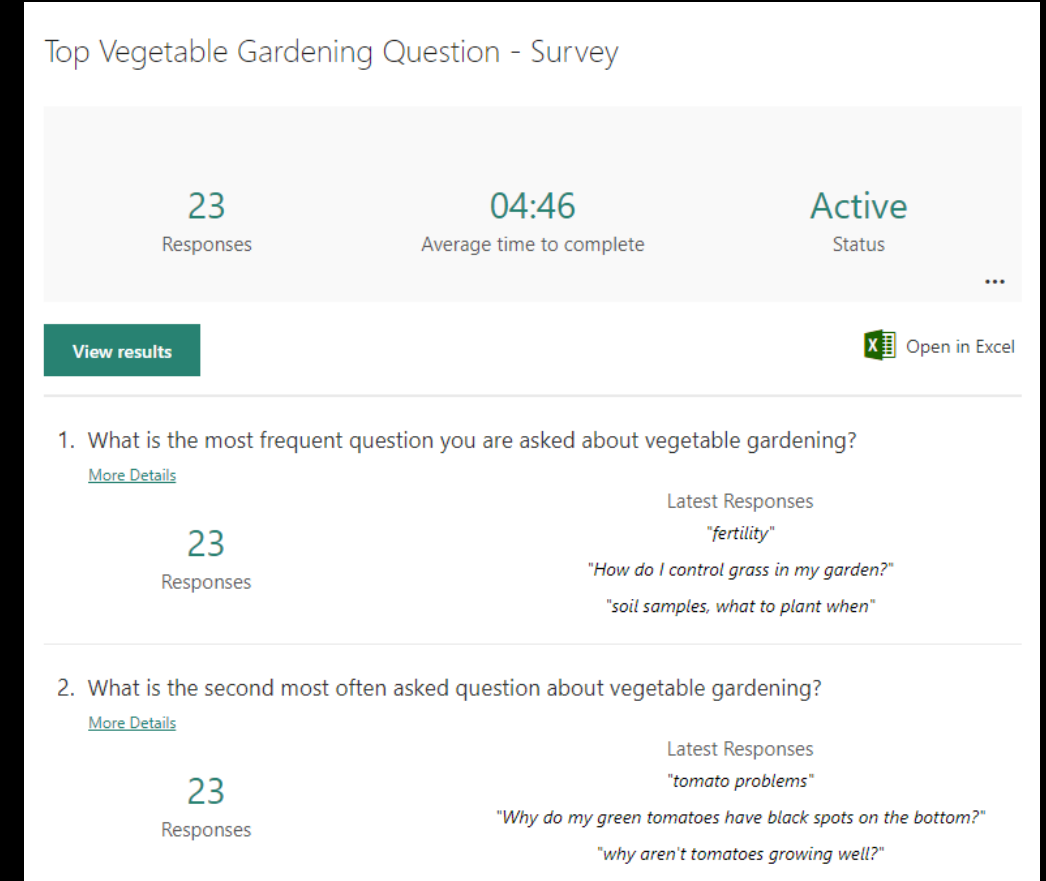


Steps to building a chatbot:

1. Choose a platform based on your team's capabilities
2. Decide on user journey/scope and chatbot type (retrieval or AI)
3. Choose your bot personality
4. Select a must-have list for bot functionality
5. Establish the bot's "flow"

Choose a narrow - but relevant - subject for your first bot.

- We had to narrow the scope of our bot to ONE section of our site so we chose the most popular page: **vegetable gardening!**
- We surveyed our ag agents (using Microsoft forms) for input on their most frequent veggie questions. <http://bit.ly/veggie-survey>



Disclaimer: Limitations on staff and resources will dictate the type of bot and how you build it.

- We had to narrow the scope of our bot to ONE section of our site.
- We had to work without the use of a specialist or agent.
- We used existing content as a data source.

Q. What causes the flowers to drop off my tomato plants?

A. During unfavorable weather (night temperatures lower than 55 degrees F or above 72 degrees F and day temperatures above 95 degrees F with dry, hot winds), tomatoes do not set fruit and the flowers drop. The problem usually disappears as the weather improves.

Q. What causes the young leaves of my plants to become pointed and irregular in shape? I noticed the twisting of the leaves and stems after spraying the plants for the first time.

A. Your tomato plants have been injured by 2,4-D or a similar weed killer. Never use the same sprayer for weed control in your vegetable garden you used on your lawn. Drift from herbicides originating one-half mile or more away can also injure tomato plants. A virus disease called cucumber mosaic virus (CMV) can mimic these symptoms.

Q. How often should my tomato plants be fertilized?

A. Fertilize the garden before planting tomatoes. Apply fertilizer again when fruit first sets. After the first fruit sets, side-dress the plants with additional fertilizer every two weeks. Fertilize plants grown on sandy soils more frequently than those grown on heavy clay soils. A general side-dress fertilizer recommendation is 1 1/2 level tablespoons of a complete fertilizer (10-20-10 or 13-13-13) scattered around the plant and worked into the soil.

tomato plants, because the fallen leaves around the base of the plant feed the fungus and allow it to build up near the plant and cause damage. Crop rotation also reduces the incidence of southern blight.

Q. My tomato plants wilted rapidly. When I cut the stem open, I found a brown ring around the inside.

A. This is fusarium wilt caused by a soilborne fungus that attacks tomatoes and other crops. Use resistant varieties to control this disease. Most commercial tomato varieties are resistant. Before you plant a cultivar, make sure it is resistant to fusarium wilt. This resistance is denoted by the letter F after the name; for example, Celebrity VFN.

Q. The lower foliage on my tomatoes is beginning to turn yellow and drop. The leaves have circular dark brown to black spots.

A. This is Alternaria leaf spot or early blight, a common problem on tomatoes that causes defoliation usually during periods of high rainfall. Plant tomatoes on a raised bed to improve water drainage, and space them so air can move to dry the foliage and prevent diseases. Start a fungicide spray program when the fruit is set and continue at one-week intervals during the growing season until harvest. Use a fungicide such as Daconil approved for home garden use.

Home Gardening Series Tomatoes

Craig R. Andersen
Associate Professor and
Extension Specialist -
Vegetables

Environment

Light – sunny
Soil – well-drained loam
Fertility – medium-rich
pH – 5.8 to 7.2
Temperature – warm
Moisture – moist

Culture

Planting – transplant after danger of frost or midsummer
Spacing – 18-24 x 48-72 inches
Hardiness – tender, frost sensitive
Fertilizer – heavy feeder

Tomatoes – *Lycopersicon esculentum* - Perennial

Tomatoes belong to a group of plants in the nightshade family. Its edible relatives include Irish potatoes, eggplant, peppers and tomatillos. Tomatoes originated in the Peru-Ecuador area and spread northward in pre-Columbian times to Mexico, where they were first domesticated. Spanish explorers carried the plants



a tender, warm-season perennial that is handled like an annual in summer and fall gardens.

Today, 95 percent of all American gardeners grow tomatoes; they are the most popular garden vegetable in Arkansas. According to the U.S. Department of Agriculture, four out of five people prefer tomatoes to any other homegrown food. Tomatoes rank number one in terms of their contribution of nutrients to the American diet, simply because we eat a lot of them.

1. Choose a platform.

- Choose s
- Choose s
- bit.ly

Bot Name	Platform	Features	Programming languages / Apps / Integration	Technical details	License	Languages	Project Link	Channels	Clients/Fields	More information
IBM Watson Conversation Service	-	Built on a neural network (one billion Wikipedia words). Has three main components: Intents, Entities, Dialog	Node SDK Java SDK Python SDK iOS SDK Unity SDK	-	Free Standard Premium https://www.ibm.com/watson/developercloud/conversation.html#pricing-block	English, Japanese	https://www.ibm.com/watson/developercloud/conversation.html	speech image text	Healthcare, Finance, Legal, Retail, Fantasy Football	https://www.youtube.com/watch?v=1rT11WEbg5U
AgentBot	Aivo's own natural language processing technology.	Understands natural language. Memory to maintain coherence during long conversations. Gathers customer information to deliver customized solutions. Continuous evolution. Clarifies intent.	Use our REST API to integrate with your CRM and other platforms.	Integrates with any CRM, internal system, human chat and third party application.	http://agentbot.net/en/request-a-demo/	English, Spanish, Portuguese	http://agentbot.net/en/	voice or messenger channel	Telecommunications and Cable Operators E-Commerce and Online Services Banks and Financial Services Government	https://www.youtube.com/watch?v=KEHMP6TkbSU
Twyla	A proprietary AI platform.	Learns from agent/customer live chats. Blends machine learning and rule-based methods. Answers questions, deflects tickets.	Analyses data either via the API of your helpdesk or chat solution, or a secure file upload.	Is integrated with most major cloud Helpdesk and Live Chat solutions, like Zendesk, Salesforce and Liveperson. So no new processes or software.	Twyla is Software as a Service (AI-as-a-Service) and so comes at a monthly subscription cost, with no up-front setup or installation fees.	English	https://www.twylahelps.com/	Web Facebook Telegram Through messenger apps and live chat	Automation and self-service customer support.	https://www.youtube.com/watch?v=An4UmvqAx0Q
Pypestream	Pypestream's Smart Messaging Platform.	Pypestream uses a patented framework of 'Pypes' and 'Streams'. Natural Language Processing and keyword parsing.	The Smart Messaging Framework Pypeconnect SDK Pypemanager The Pypestream mobile app API plug-ins and integrations	An open and flexible API platform allows for custom integrations and development of 3rd party connectors, plugins and extensions.	Contact Pypestream to obtain current pricing.	English	https://www.pypestream.com/	Pypestream mobile app Brand apps/SMS Web chat Messenger IoT website Pype	By April 2016, the company had 500 businesses signed up and using the messaging platform, including Washington Gas and Billboard.	https://www.youtube.com/watch?v=nfPxUXx7I2w
Live Agent	-	https://www.ladesk.com/features/	https://www.ladesk.com/integrations-and-plugins/	-	14-Day Free Trial With All Plans Plans (All-Inclusive \$39/month) Downloadable/ Enterprise licence SaaS licence	39 languages https://www.ladesk.com/features/39-translations-available/	https://www.ladesk.com/	Email Voice Social Chat	LiveAgent is an all-in-one customer support software. Ticketing. Live chat. Support portal, Call center, Social network	https://www.youtube.com/watch?v=kQID4yyMcLU

2. Decide on client journey and bot type.

- We initially explored AI chatbots using Dialogflow – discovered it was too time consuming and resource heavy.
- Goal: use fact sheet FAQs to answer common veggie questions and reduce calls or emails about repetitive questions.

A-Z Vegetable Gardening in Arkansas


For vegetable gardening help contact your **local county agent**.

Plan Prepare Plant Maintain

Choosing Vegetables for the Season

Many new cultivars are resistant to diseases and are heavy producers. If you have favorite cultivar that works well for you, continue to use it but you may wish to experiment with small plantings of new cultivars. Home Gardening Series fact sheets on individual vegetables will list cultivar recommendations. In addition, new seed catalogs and web sites will list many cultivars. If a cultivar is designated to be an **All-American Selection** (AAS) it has been tested and found to be widely adapted.

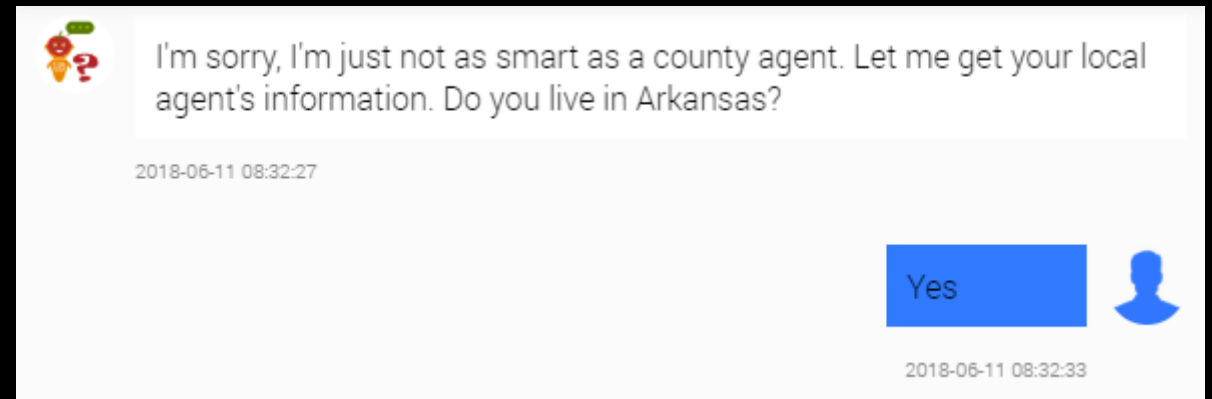
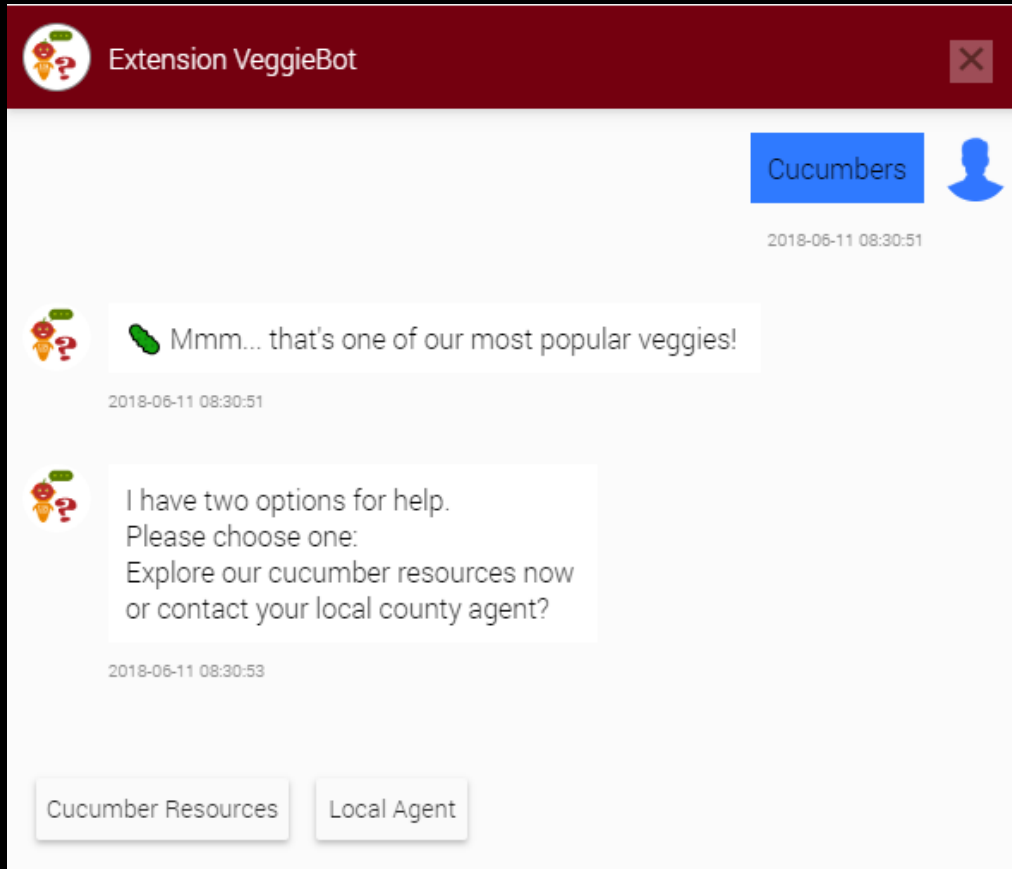
Some vegetables require a cool growing season and must be planted early enough to mature before hot weather or late enough to mature in the cooler fall months. Others require warmer or even hot weather and longer periods to reach maturity.



Zone	Mean Date of Last Spring Freeze	Mean Date of First Fall Freeze
A	March 20	November 15
B	March 27	November 7
C	April 1	October 30
D	April 10	October 24
E	April 20	October 20

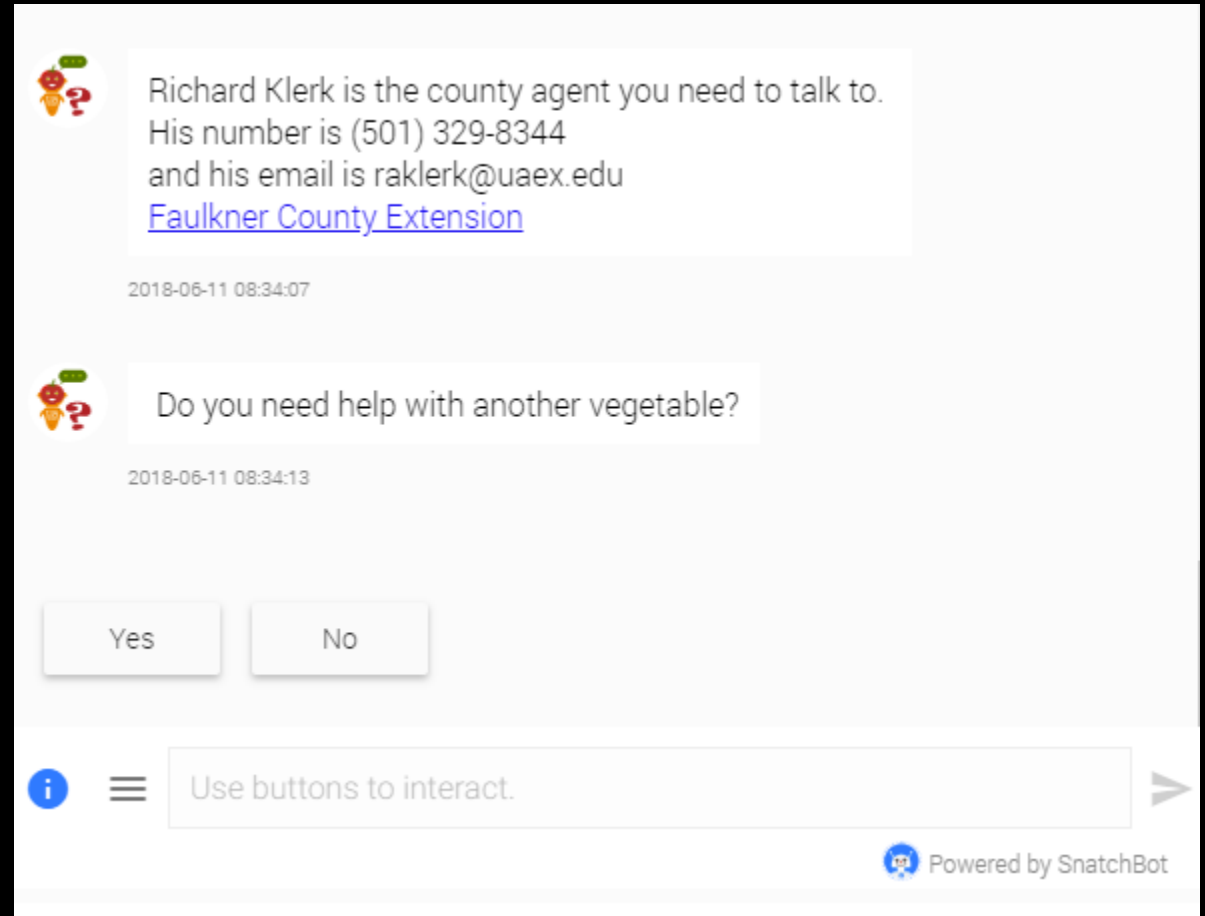
3. Give your 'bot a personality!

- We wanted our bot to be friendly like an agent would be.
- We used personal terms and emojis.
- We deferred as often as possible to the agent.



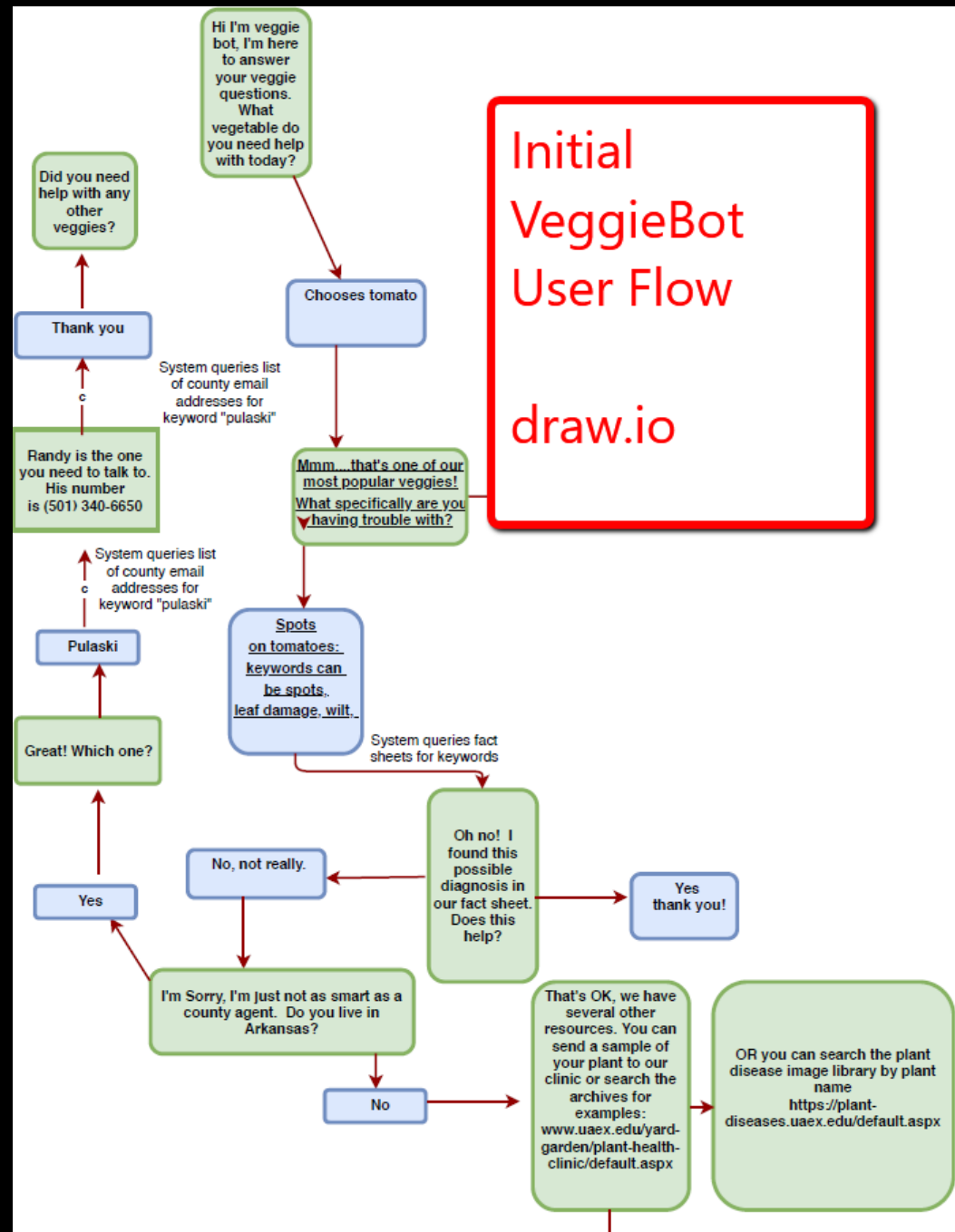
4. Decide on a must-have list.

- Must give veggie options
- Must allow for clicking
- Must be user friendly
- Must allow for photos
- Must connect the user to a county agent
- We disabled typing. Why?



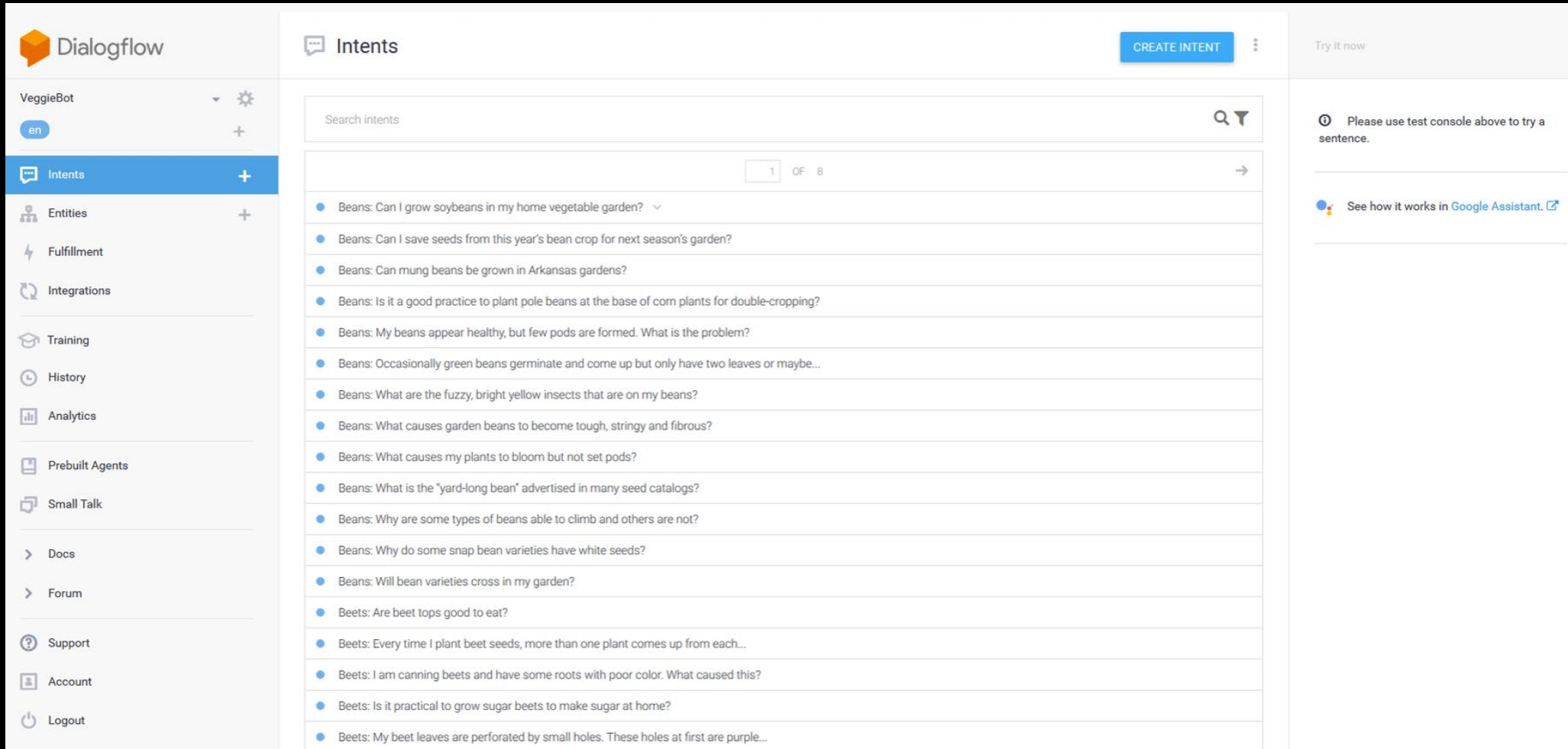
4. Decide on chatbot “Flow”.

- I used draw.io to create initial user flow for an AI bot.
- We later decided this was too much programming!



5. Choose a platform.

We began bot development using Dialogflow, Google's chatbot platform.



The screenshot shows the Dialogflow console interface. On the left is a sidebar with navigation options: Intents (selected), Entities, Fulfillment, Integrations, Training, History, Analytics, Prebuilt Agents, Small Talk, Docs, Forum, Support, Account, and Logout. The main area is titled 'Intents' and contains a search bar and a list of 16 intents. The intents are categorized by topic: Beans (10) and Beets (6). A 'CREATE INTENT' button is in the top right. On the far right, there is a 'Try it now' section with a message: 'Please use test console above to try a sentence.' and a link to 'See how it works in Google Assistant.'

Intent
Beans: Can I grow soybeans in my home vegetable garden?
Beans: Can I save seeds from this year's bean crop for next season's garden?
Beans: Can mung beans be grown in Arkansas gardens?
Beans: Is it a good practice to plant pole beans at the base of corn plants for double-cropping?
Beans: My beans appear healthy, but few pods are formed. What is the problem?
Beans: Occasionally green beans germinate and come up but only have two leaves or maybe...
Beans: What are the fuzzy, bright yellow insects that are on my beans?
Beans: What causes garden beans to become tough, stringy and fibrous?
Beans: What causes my plants to bloom but not set pods?
Beans: What is the "yard-long bean" advertised in many seed catalogs?
Beans: Why are some types of beans able to climb and others are not?
Beans: Why do some snap bean varieties have white seeds?
Beans: Will bean varieties cross in my garden?
Beets: Are beet tops good to eat?
Beets: Every time I plant beet seeds, more than one plant comes up from each...
Beets: I am canning beets and have some roots with poor color. What caused this?
Beets: Is it practical to grow sugar beets to make sugar at home?
Beets: My beet leaves are perforated by small holes. These holes at first are purple...

Dialogflow: AI was better

<https://dialogflow.com/>



For creating queries, this platform would learn from interaction with the user. It could match the answer better and “learn” based on the user input in the dialog box.

Speech-to-text option for paid platform.

Dialogflow: “cons”



- Poor documentation.
- Had to program each action under the first action so we couldn't loop it and reuse an action.
- Our CMS (OU Campus) didn't like embedding it onto the page.
- It was not intuitive to use.
- Needed PHP programming skills.

Snatchbot was a better option for us.



The screenshot displays the SnatchBot web interface for configuring a bot named 'Extension VeggieBot'. The interface is divided into several sections:

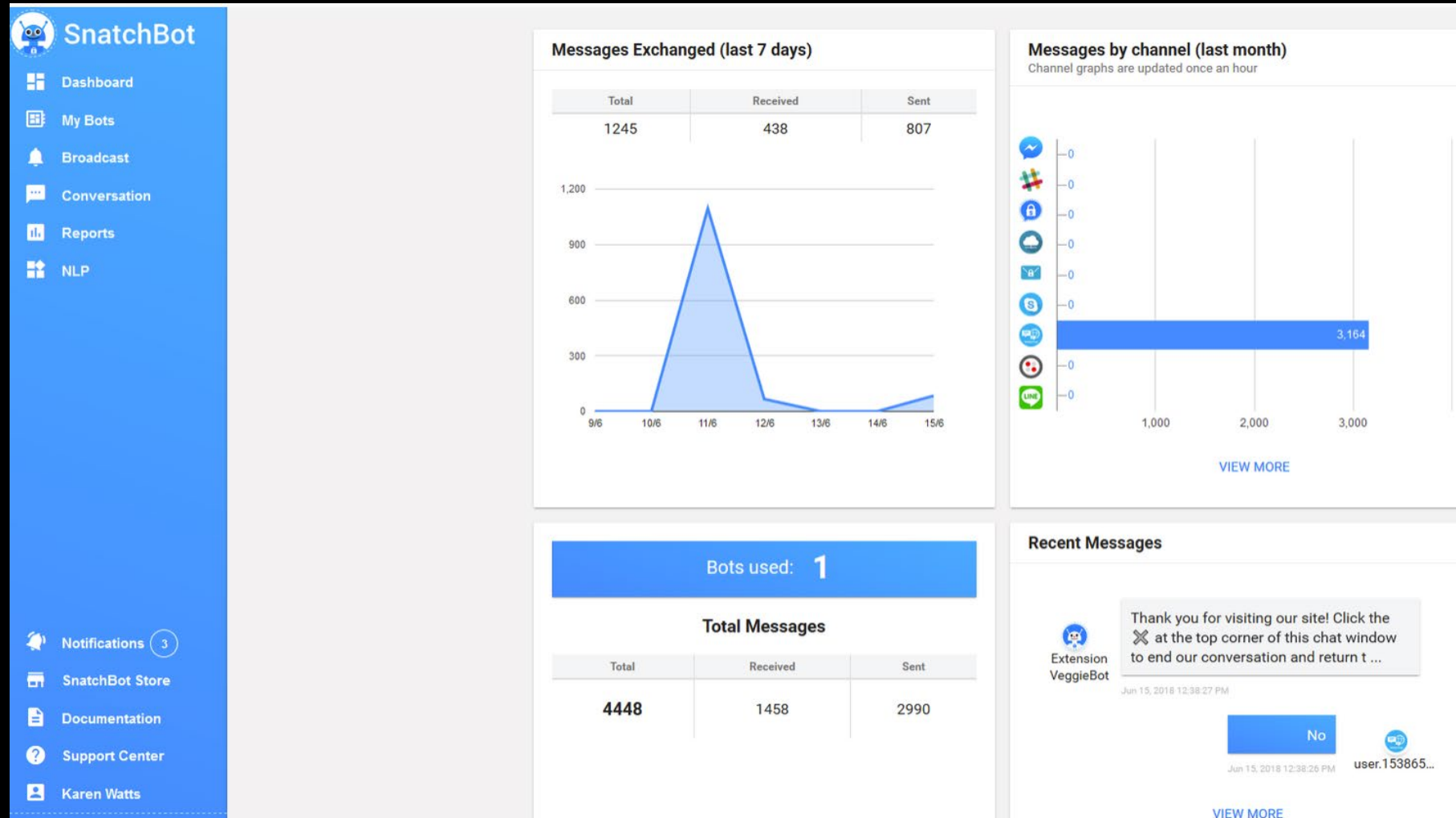
- Left Sidebar:** Contains navigation links for Build, Channels, Configure, Dashboard, My Bots, Broadcast, Conversation, Reports, NLP, Notifications (3), SnatchBot Store, Documentation, and Support Center.
- Top Bar:** Includes a 'TEST THIS BOT' button and links for 'PERSISTENT MENU', 'VIEW SCHEME', and 'GLOBAL CONNECTIONS & NLP'.
- Interactions List:** A table of bot interactions with columns for status, ID, message, and actions. The list includes interactions like 'Welcome', 'Goodbye', 'Welcome 2', 'Local CoAg: AR', 'Arkansas: Yes (Text)', 'Arkansas: Yes', 'Arkansas: No', 'Help: Yes', 'Help: No', 'Another Vegetable', 'Welcome: Cucumber', and 'Question: Cucumber'.
- Bot message Configuration:** A section for editing the 'Welcome' interaction. It shows the bot's message: 'Hi! I'm VeggieBot! The bot's reply upon reaching this interaction.' Below this is a 'Connections & NLP' section with a 'Cards' list including Text card, Image, Gallery, RSS Import, Quick replies, Send Email, and Add Attributes.
- Quick Replies Configuration:** A section for configuring quick replies. It includes a checkbox for 'Disable text input function in WebChat when quick replies are present?' (checked) and a text input field for 'Quick Replies' with 'Yes' and 'No' buttons.

Why we chose to use SnatchBot.

- <https://snatchbot.me/>
- Ready, out-of-the-box modules.
- No programming skills needed!
- Better documentation than Dialogflow.
- Easy to embed onto our website.
- Pay \$30 if you want to remove their branding.
- Easier learning curve.
- More features we would use (text to call, PayPal integration, etc.)
- Option for custom CSS.

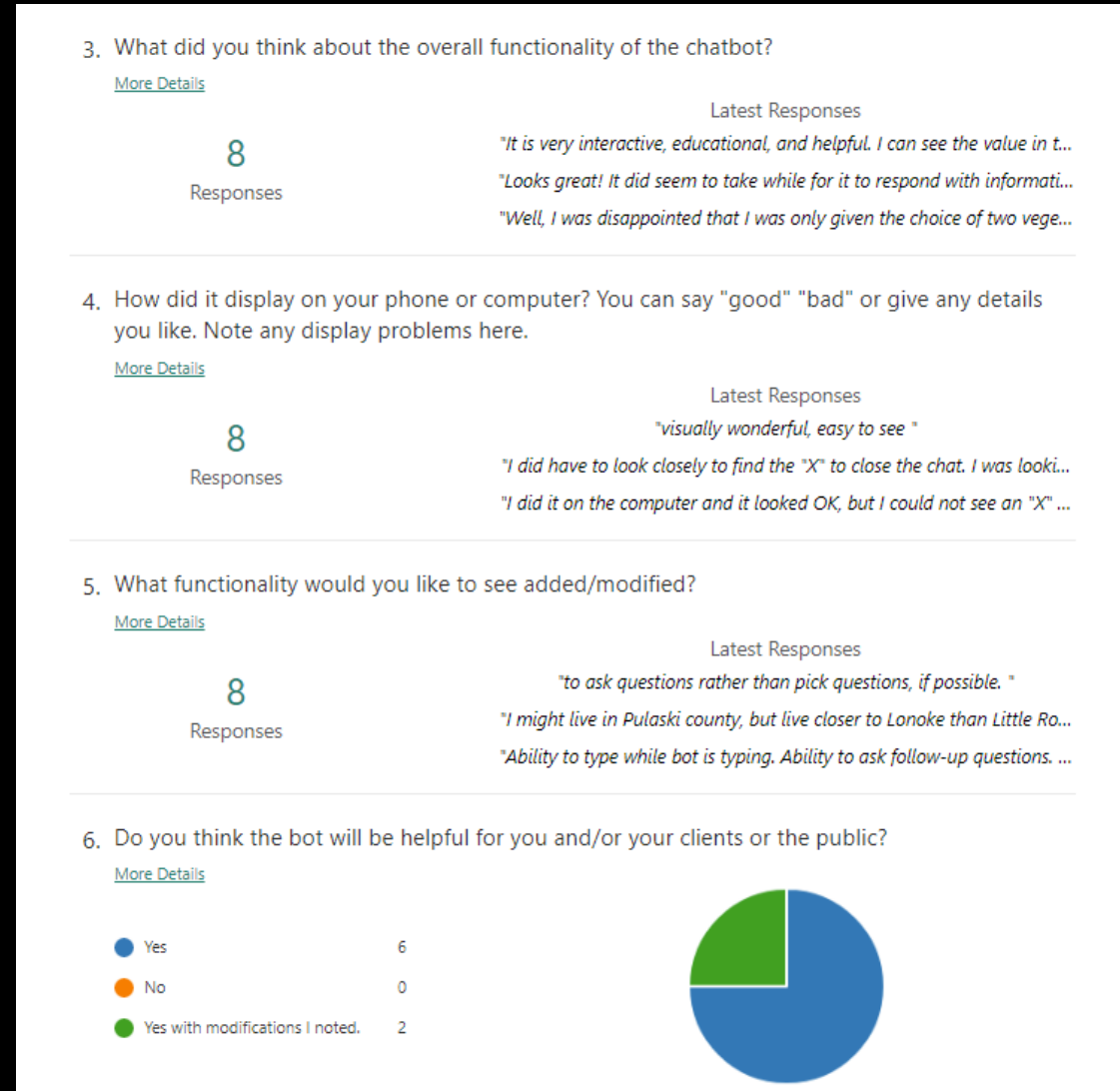


SnatchBot dashboard shows analytics.



Perform internal user testing before launch.

- You need to get agent and specialist review and buy-in before launching.
- Ensure data is correct and “flow” works.



What are possible future uses for Extension?

- Answer inquiries related to program content.
- Report technical issues to staff.
- Grant access to systems.
- Simplify complex IT processes.
- Alert users to incidents and outages.
- Provide self-service support anytime, day or night.
- Links to recipes
- Links to canning options
- Links to nutrition options

How could we cross-promote Extension programming with VeggieBot?

- Links to recipes
- Links to canning options
- Links to nutrition options

Tomatoes are high in potassium, vitamin C and other antioxidants and low in sodium, fat and calories.

Recipes

Quick Caprese Salad

Prep Time: 10 minutes

6 medium-ripe tomatoes
4 ounces fresh mozzarella cheese
6 large basil leaves
2 tablespoons extra-virgin olive oil

1 tablespoon balsamic or red wine vinegar
Salt and pepper to taste

- Cut tomatoes and mozzarella into bite-sized pieces.
- Stack basil leaves and roll into a cylinder. Cut into thin ribbons with kitchen shears or sharp knife. Sprinkle ribbons over the salad.
- Whisk together olive oil and vinegar. Drizzle dressing over the salad and sprinkle with salt and fresh ground pepper. Serve immediately. *Makes 6 servings.*

Nutrition Information Per Serving:
Calories: 112 Protein: 6 g
Fat: 8 g Carbohydrates: 6 g
Saturated fat: 3 g Fiber: 1g
Cholesterol: 12 mg Sodium: 124 mg

Fresh Tomato Sauce

Prep Time: 2 hours (includes 1 hour drain time)

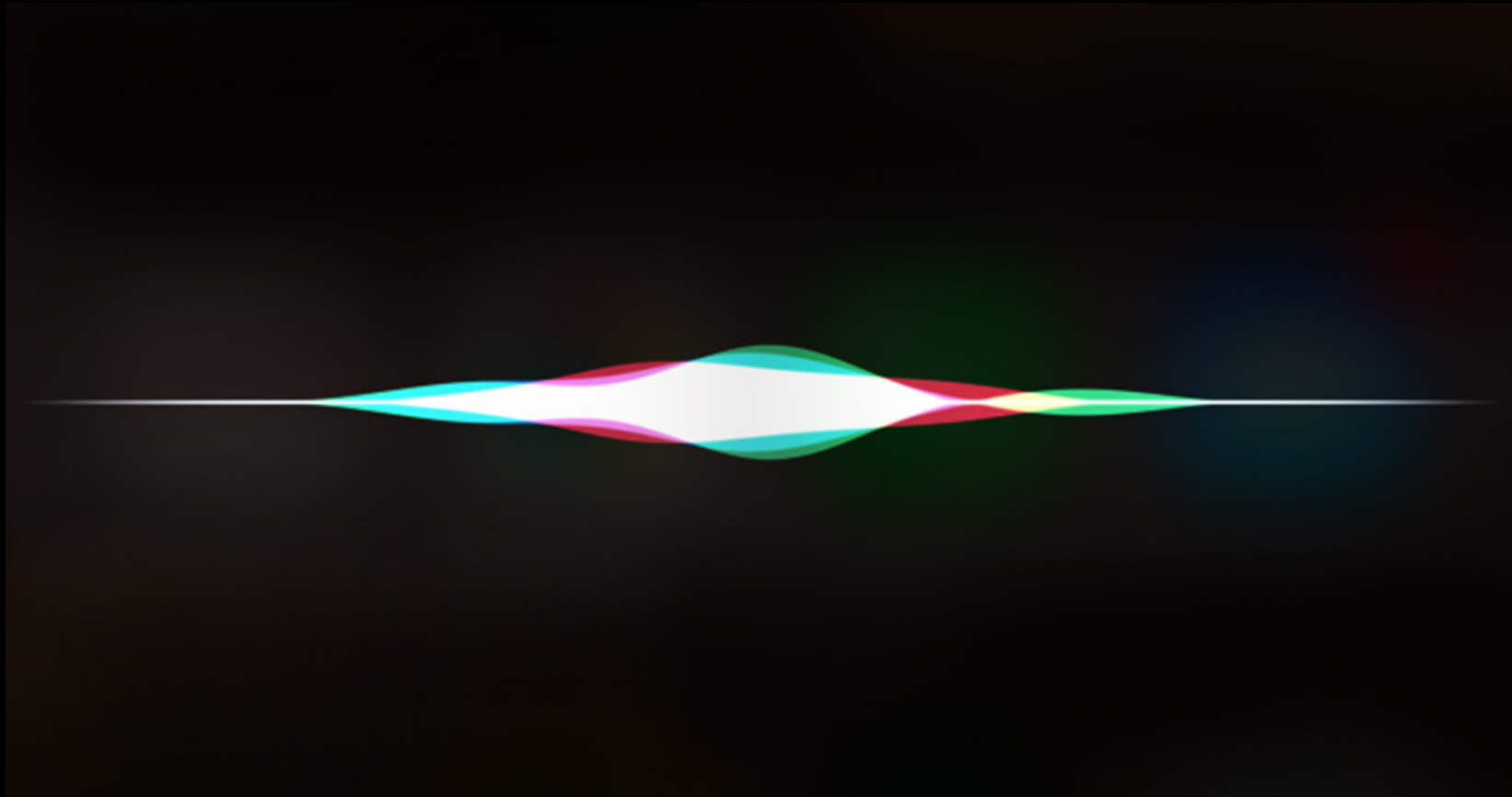
3 pounds firm, ripe tomatoes, chopped
1/8 teaspoon salt
1 red onion, thinly sliced
2 cloves of garlic, finely chopped
6-8 fresh basil leaves, finely chopped
2 tablespoons extra virgin olive oil
1/8 teaspoon sugar

- Place tomatoes in covered saucepan with 1/8 teaspoon salt. Cook over medium heat for 5 minutes. Transfer to colander and let drain for one hour.
- Return drained tomatoes to the saucepan and add the onion, garlic, basil, olive oil, sugar and a dash of salt. Cover and bring to a boil over medium heat. Reduce heat and simmer for about 40 minutes or until the sauce has thickened.
- Remove from heat and process in a food processor or blender until smooth.
- Serve over pasta, rice or baked potato. *Makes 6 servings.*

Nutrition Information Per Serving:
Calories: 84 Protein: 2 g
Fat: 5 g Carbohydrates: 10 g
Saturated fat: 1 g Fiber: 3 g
Cholesterol: 0 mg Sodium: 60 mg

Questions?

All further questions can be directed
to Siri or Cortana.



Thank you!

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Data

Customer Service team size	200 employees
Annual average loaded cost per employee	\$50,000
Average one-off cost to hire new employee	\$5,000
Staff turnover rate	20%
Breakdown of all service and support enquiries:	
*Enquiries from existing customers that a bot can potentially solve	40%
*Other Enquiries from existing customers (must be dealt with by a team member)	40%
*Enquiries from competitors' customers (must be dealt with by a team member)	40%
How many people would switch to using a bot (1)	20%
Potential increase in inquiries from non-customers given enough people on the team (2)	25%