MICHIGAN STATE UNIVERSITY

Project Plan

Cognitive Enterprise Software Robots

The Capstone Experience

Team Volkswagen

Kevin Gu
Zachary McCullough
Maryam Irannejad Najafabadi
Fynn Reckhorn
Amelia Wilson

Department of Computer Science and Engineering
Michigan State University

Spring 2019

From Students…
…to Professionals

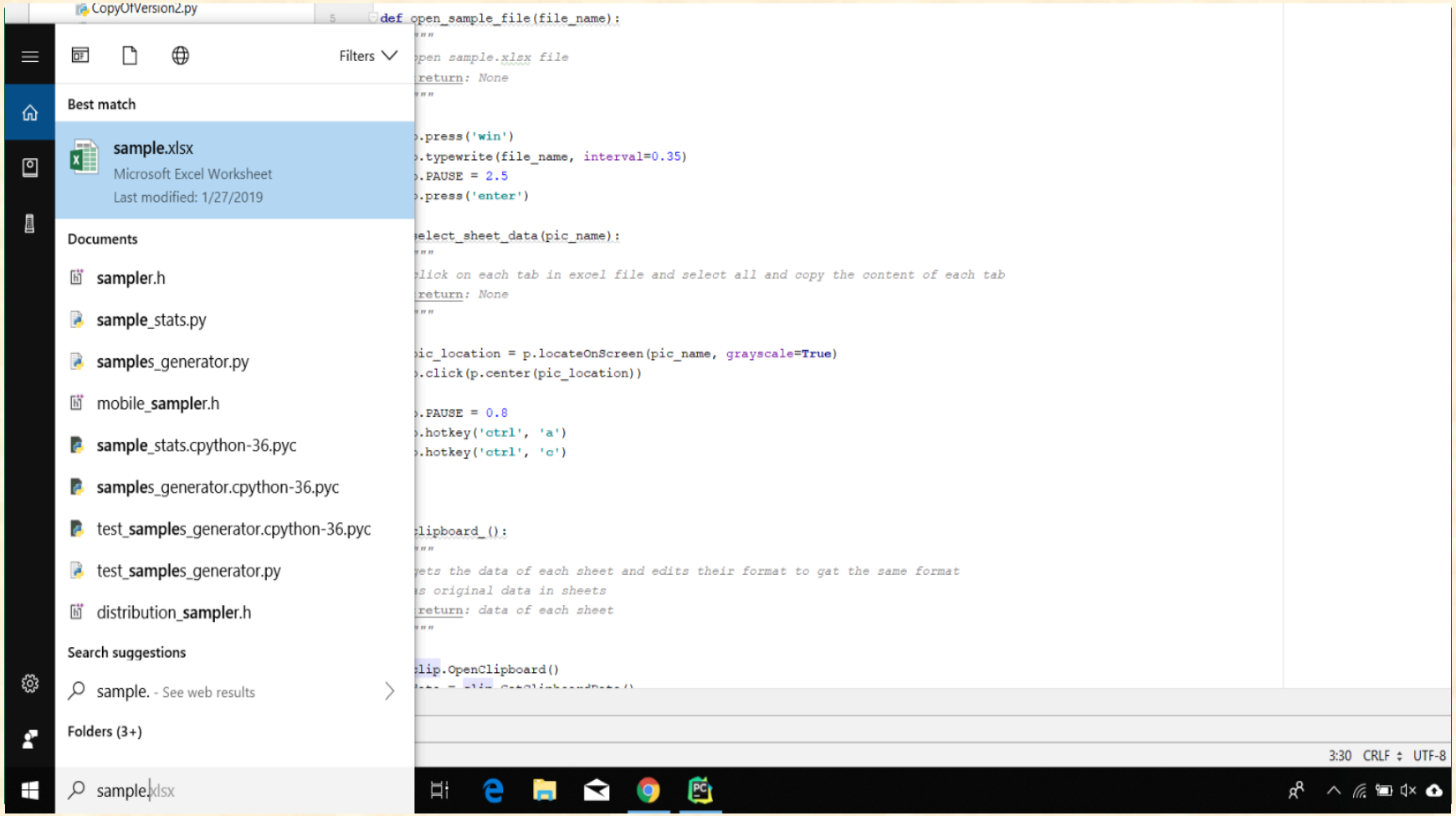
Functional Specifications

- Similar to automation on the shop floor, this project automates repetitive tasks in the indirect business processes at Volkswagen
  - Human Resources, Logistics, Finance
  - Extract/analyze data from excel files, send email reminders, etc…
- The goal being that the bot can spot when an employee is repeating a task and offers to takeover.
- Stretch Goal: Utilize Natural Language Processing to read and understand emails.
- Employees able to reallocate resources to what their specialty is, rather than spending time on repetitive & simple processes
- Proof-of-Concept showcasing the feasibility and efficiency of a soft-bot. The beginning use case of a generalizable AI solution.

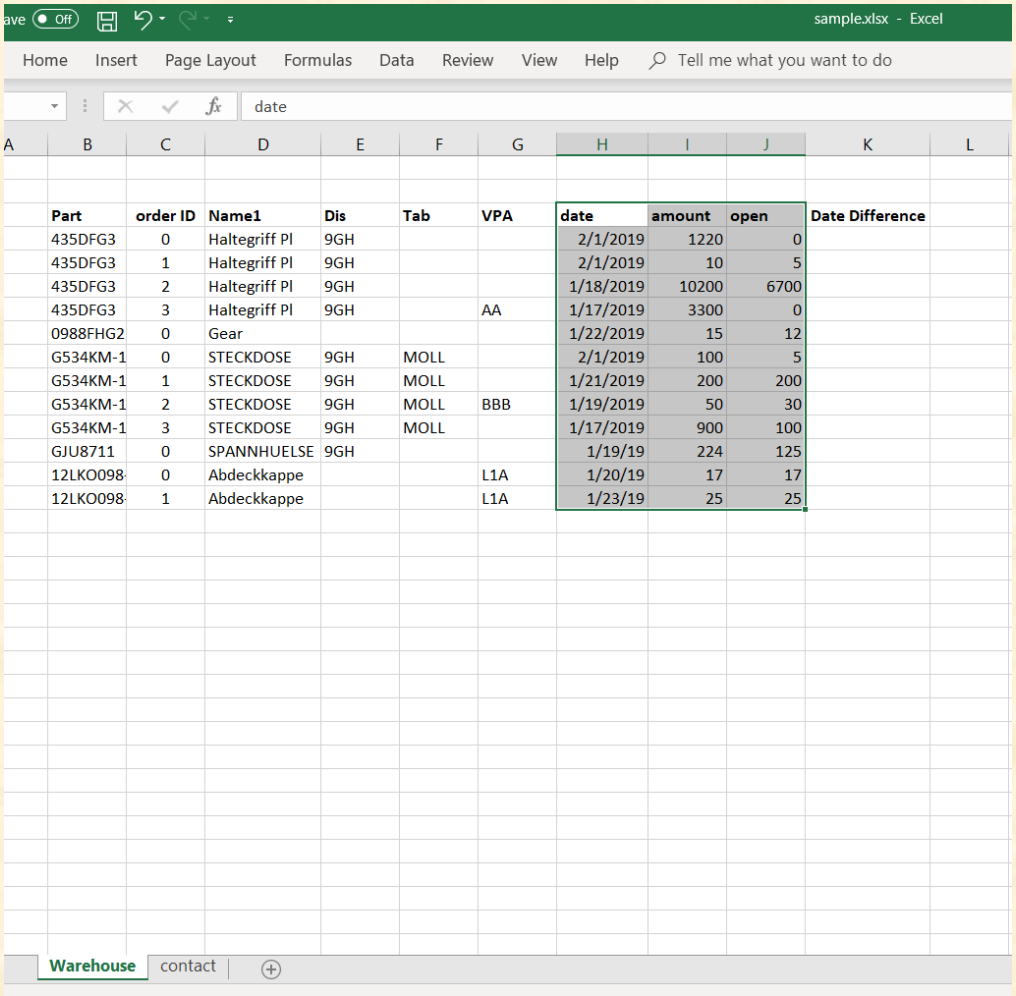
Design Specifications

- **Phase I**: Automate specific processes manually derived from the business world. Develop logging system recording clickstreams.
- **Phase II**: Add a cognitive component to predict next clicks, using the clickstream of a specific process as input.
- **Phase III**: With Natural Language Processing, enable the bot to read emails, then classifying which need further action from a human.

Screen Mockup: Searching for Predetermined File

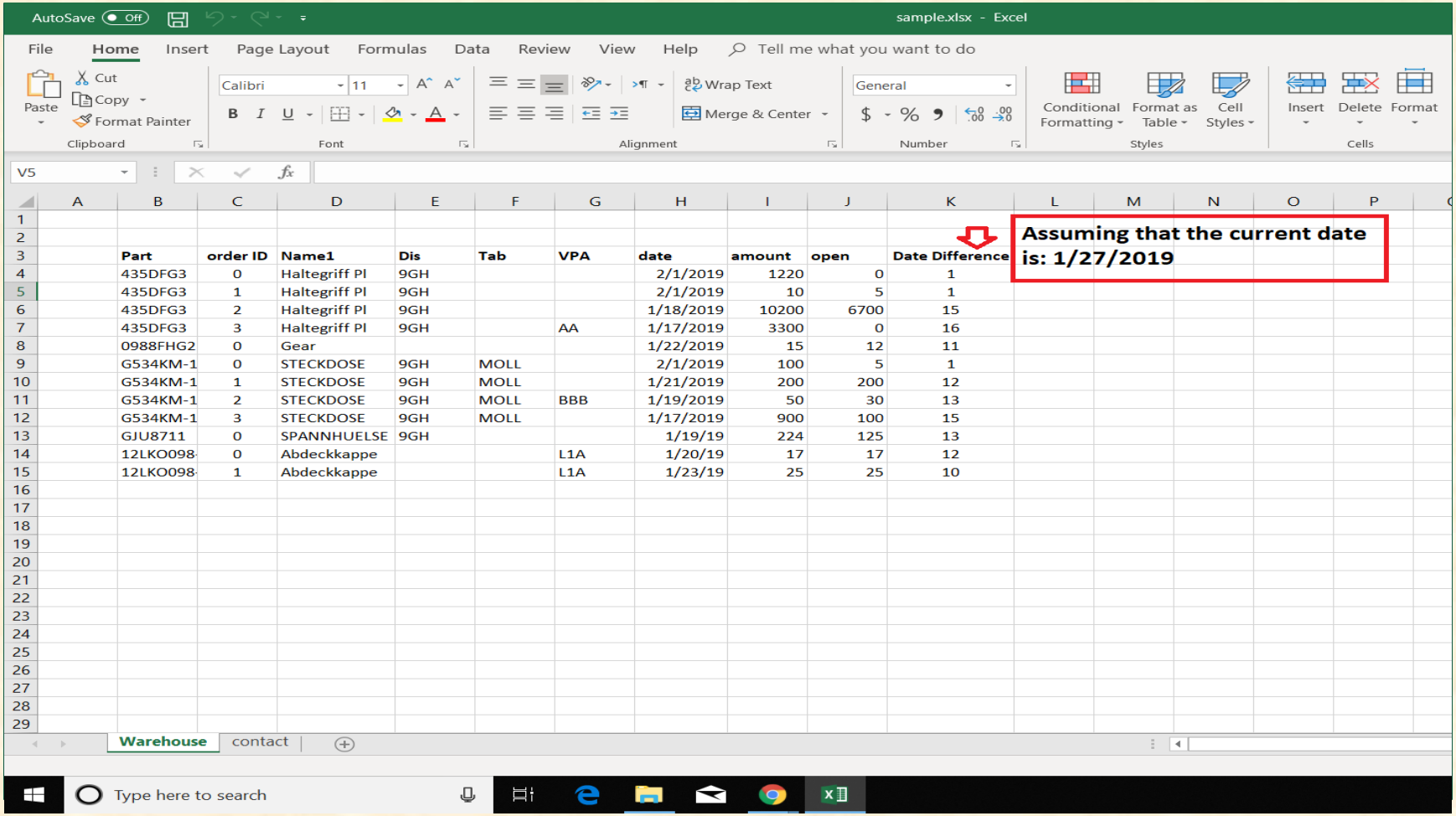


Screen Mockup: Parsing Data



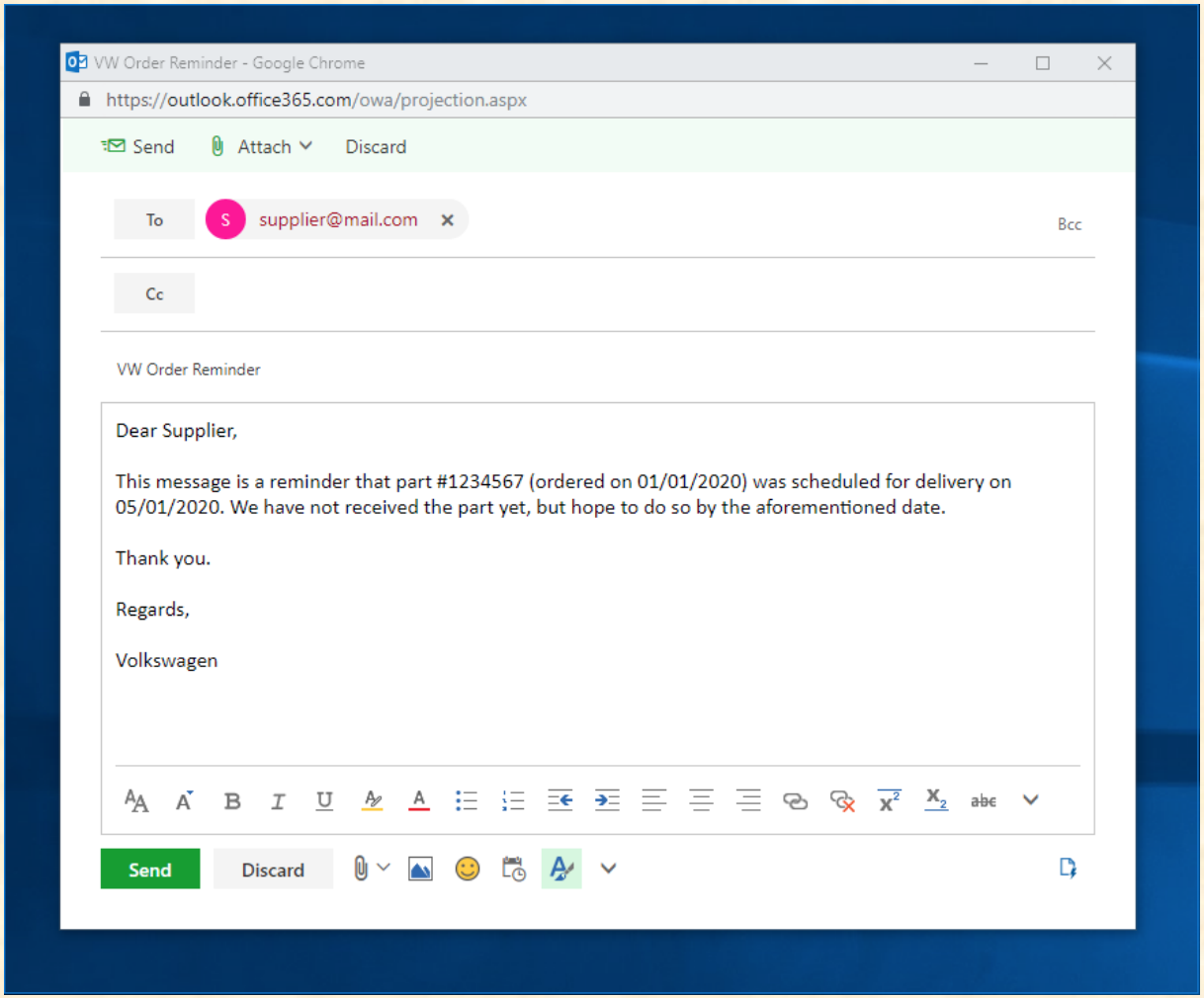
Part	order ID	Name1	Dis	Tab	VPA	date	amount	open	Date Difference
435DFG3	0	Haltegriff Pl	9GH			2/1/2019	1220	0	
435DFG3	1	Haltegriff Pl	9GH			2/1/2019	10	5	
435DFG3	2	Haltegriff Pl	9GH			1/18/2019	10200	6700	
435DFG3	3	Haltegriff Pl	9GH		AA	1/17/2019	3300	0	
0988FHG2	0	Gear				1/22/2019	15	12	
G534KM-1	0	STECKDOSE	9GH	MOLL		2/1/2019	100	5	
G534KM-1	1	STECKDOSE	9GH	MOLL		1/21/2019	200	200	
G534KM-1	2	STECKDOSE	9GH	MOLL	BBB	1/19/2019	50	30	
G534KM-1	3	STECKDOSE	9GH	MOLL		1/17/2019	900	100	
GJU8711	0	SPANNHUELSE	9GH			1/19/19	224	125	
12LKO098	0	Abdeckkappe			L1A	1/20/19	17	17	
12LKO098	1	Abdeckkappe			L1A	1/23/19	25	25	

Screen Mockup: Calculating Date Difference



Part	order ID	Name1	Dis	Tab	VPA	date	amount	open	Date Difference
435DFG3	0	Haltegriff Pl	9GH			2/1/2019	1220	0	1
435DFG3	1	Haltegriff Pl	9GH			2/1/2019	10	5	1
435DFG3	2	Haltegriff Pl	9GH			1/18/2019	10200	6700	15
435DFG3	3	Haltegriff Pl	9GH		AA	1/17/2019	3300	0	16
0988FHG2	0	Gear				1/22/2019	15	12	11
G534KM-1	0	STECKDOSE	9GH	MOLL		2/1/2019	100	5	1
G534KM-1	1	STECKDOSE	9GH	MOLL		1/21/2019	200	200	12
G534KM-1	2	STECKDOSE	9GH	MOLL	BBB	1/19/2019	50	30	13
G534KM-1	3	STECKDOSE	9GH	MOLL		1/17/2019	900	100	15
GJU8711	0	SPANNHUELSE	9GH			1/19/19	224	125	13
12LKO098	0	Abdeckkappe			L1A	1/20/19	17	17	12
12LKO098	1	Abdeckkappe			L1A	1/23/19	25	25	10

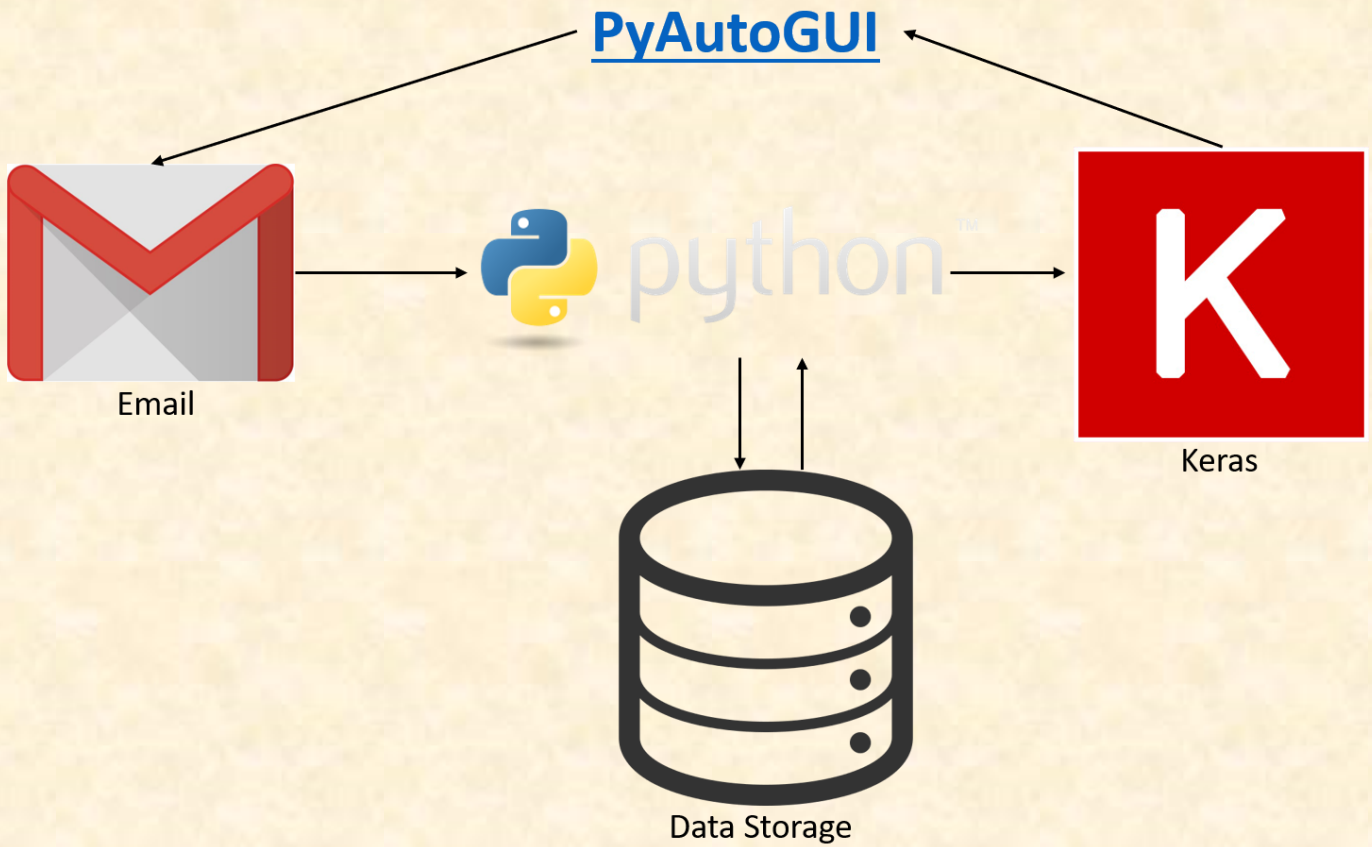
Screen Mockup: Automated Email Composition



Technical Specifications

- Automation – given a set of specific tasks, bot completes them the same way a human would.
- PyAutoGui/PyWinAuto - interact with GUI like a human user
- Monitoring System – ensure bot preforming correctly; is able to wait while application opens.
- Machine Learning – predict next clicks in a repetitive business process.
- Natural Language Processing – classify emails to determine if more action is needed

System Architecture



System Components

- Hardware Platforms
  - Windows Architecture
  - Python 3

System Components

- Software Platforms / Technologies
  - GitHub
  - Slack
  - RegEx
  - PyAutoGUI
  - Pywinauto
  - Keras
  - TensorFlow
  - NumPy
  - Matplotlib

Risks

- **Risk 1 - Generate Data to Train the Bot**
  - We have to generate reasonable and large amount of data that relatively easy for human to understand to train the bot.
  - We assigned two members to work on a solution to generate the data.
- **Risk 2 - Efficient Logging a Human and Machine Can Understand and Use**
  - Humans and computers work very differently. We need to find a way to log human's activity that Machine will be understand and use.
  - Use more shortcuts on keyboard instead of mouse clicked as much as possible.
- **Risk 3 - Generalizability of the Finished Project**
  - The risk of automating specific processes but failing generalize and apply our findings to diverse scenarios.
  - Working to develop reusable modules that can be used in different scenarios. Frequent communication with the client to gage which processes would most benefit from the bot.
- **Risk 4 -Machine Learning Knowledge**
  - Machine learning and artificial intelligence are still largely open research areas. Our knowledge in this field is very limited one huge risk is delivering an impressive cognitive bot in 15 weeks.
  - We plan to start exploring the cognitive components of the project early. Generating data and researching various approaches to similar problems during phase I.

Questions?