

# Build an NLP-based Auto-Complete Application

## Description

This workshop helps learners build a basic version of the very common auto-complete functionality found in most messaging services (compose a new email in G-mail and as you type, you will see some suggested next words appearing). We will explore Machine Learning/Natural Language Processing (NLP), Docker and Flask to build and containerize this application. By the end of this workshop, you will have a basic plug & play code so that you can modify it for your own hacks.

## Learning Outcomes

After this workshop, you will be able to:

- Understand the magic behind Machine Learning and Natural Language Processing on a high-level
- Learn to build Flask based Python applications
- Understand and learn to use Docker to build a containerized application

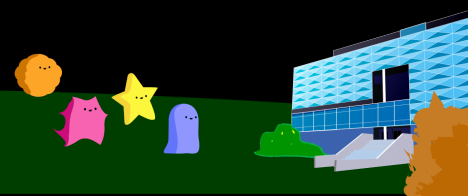
## Prerequisite Knowledge

- Python, a good working knowledge
- Basic usage of Git and GitHub (Nice to have but not strictly necessary, can be taught in 2 min)
- Be familiar with using the Terminal (for linux & mac users) or Command Prompt (for windows users)
- HTML & Javascript (Not a strict requirement as templates will be provided, but understand HTML on a high-level)

## Pre-Workshop Checklist

Before the workshop, please make sure you complete the following items:

- **Python:** <https://www.python.org/downloads/>
- **PIP** package manager: <https://pip.pypa.io/en/stable/installation/>
- **Flask**
  - You need to have “pip” installed for this from point 2
  - Installation: <https://flask.palletsprojects.com/en/2.2.x/installation/>



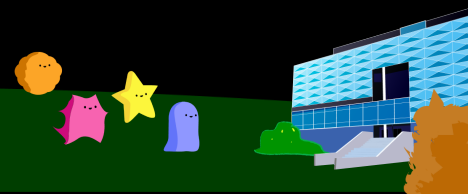
If this is the first time using Flask I would suggest to go over just 2 or 3 videos in this playlist, it is very helpful. I would be going over the basics as well during the workshop

<https://www.youtube.com/watch?v=MwZwr5Tvyxo&list=PL-osiE80TeTs4UjLw5MM6OjgkjFeUxCYH>

- **Docker:**
  - Installing Docker Desktop will be enough to install everything  
<https://www.docker.com/products/docker-desktop>
- Create a [GitHub](#) Account
  - These quick exercises should help you get setup  
<https://docs.github.com/en/get-started/quickstart>
  - Access the hands-on coding walkthrough here:  
[https://github.com/Anirudh42/htn\\_next\\_word\\_prediction](https://github.com/Anirudh42/htn_next_word_prediction)

## Technical Jargon and Definitions

- **Machine Learning:** A set of techniques and algorithms which are designed to learn from data rather than having explicit rules defined. These “learned machines” can be used for various tasks from predicting unknown data points to grouping new data.
- **Natural Language Processing:** A set of tools and techniques that are specifically built to deal with textual information such as chats, emails, survey responses, essays etc.
- **Python:** A high-level programming language used to write code to perform certain tasks
- **Flask:** A Python based framework that will help you build web application with very little effort
- **Docker:** A tool that will help package or box all your software so that once it has been packaged it can be installed on anybody’s computer even if they don’t actually have any of the tools needed to run the said software



## Timeline (60 min)

Time	Module	Description
1 min	Showcase the final application	Demo of the application
10 mins	Short intro to ML & NLP along with a fun exercise	Machine Learning and Natural Language Processing explained with examples
2 mins	What is Flask?	Understanding the basic structure of a Flask App
2 mins	Time to Code - Simple Flask app	Hands-on exercise
10 mins	Containerization and Intro to Docker	What is Docker, how is it used and why is it needed here?
10 mins	Time to Code - Docker	Hands-on exercise
10 mins	Autocomplete application - concepts explained first	The mathematical concepts (very simple ones) behind next-word prediction explained visually
10 mins	Time to Code - Building the containerized application	Hands-on exercise to build the application

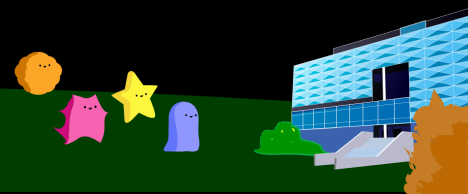
## Workshop Lead Contact

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## **Additional Resources**

### **Hack the North Resources**

#### [Hack the North 2022 Event Schedule](#)

Check this out to stay up-to-date on activities, workshops, and other key happenings this weekend.

