Development portfolio

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Projects:

RichCaptions

Symbolic math/science captions for educational videos

Safely

Smart wearable technology to end campus violence

Twitter Sentiment Analysis

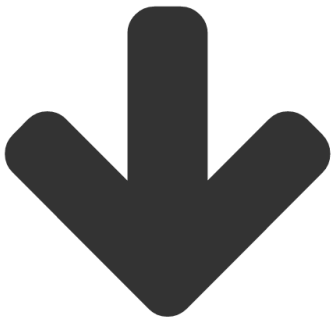
Use self-labelled tweets, linguistic analysis, and machine learning to understand language

Concept mastery:

- Git and collaborative workflows (i.e. “Git flow”, feature-branch)
- n-tier application design and implementation; Model-View-Controller pattern
- RESTful APIs: Design, use, and implementation

Highly-adept languages and frameworks:

- Django web framework, Django REST framework
- Python
- JavaScript/TypeScript + AngularJS
- Microsoft ASP.NET MVC + WebAPI C#



RichCaptions

Symbolic math/science captions for educational videos

Project live at:
http://apps.pramodk.net:8001/

GitHub repo:
http://github.com/p13i/rich-captions/

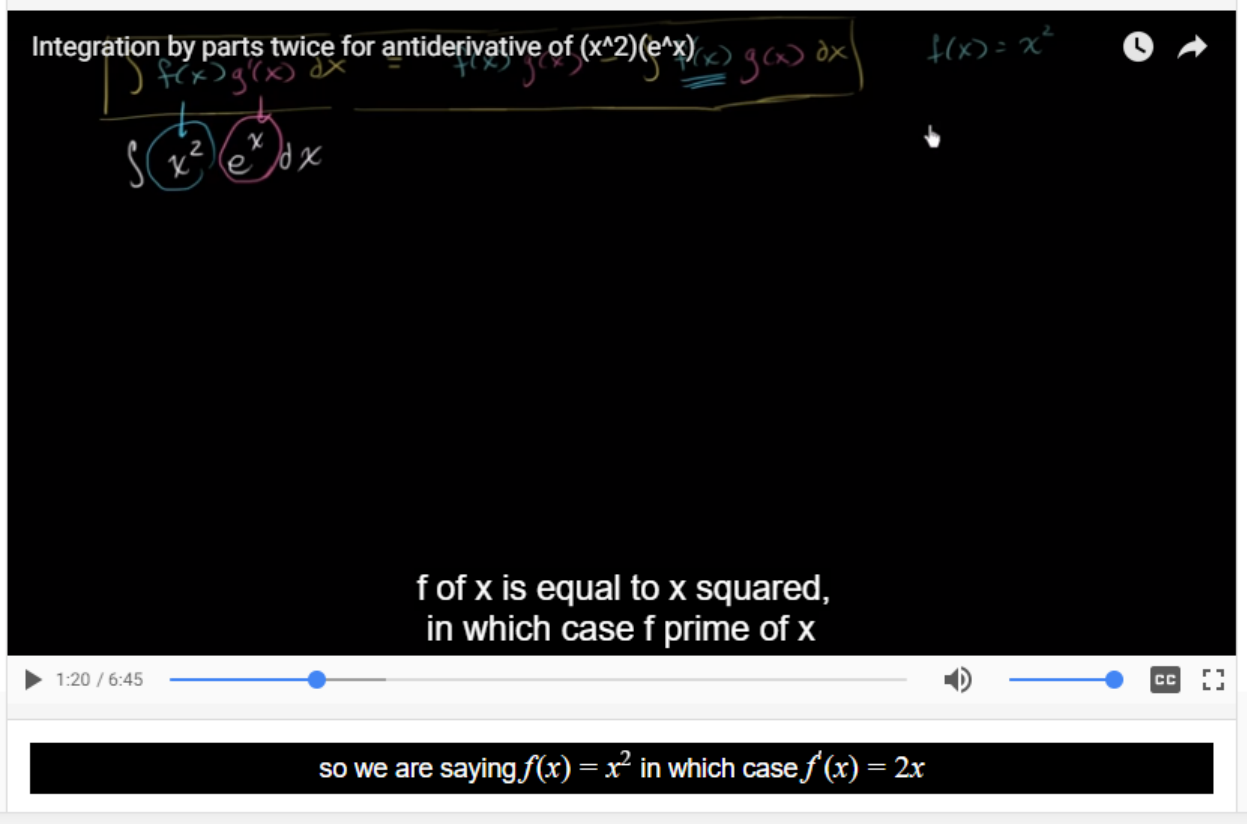
Problem identified:

- Online education is rapidly gaining momentum
- Video captioning systems are limited to displaying simple plain-text
- Math/science students learn better by reading semantically-useful symbols

Solution created:

- Create web application where content creators can easily caption their videos in LaTeX, the most popular tool for typesetting math and science textbooks and academic papers
- Allow anyone on the internet to watch these captioned videos without cost

Illustrative example:



Design paradigms:

- REST API design and documentation
- Material Design

Technologies used:

- AngularJS + Javascript/jQuery
- Django + REST framework
- YouTube <iframe/> API
- LaTeX, KaTeX

Safely

Smart wearable technology to end campus violence

Problem identified:

- Almost one in four women and one in twenty men experience sexual assault as an undergraduate
- Students can often find themselves in situations where a smartphone is not accessible for getting help

Solution created:

- A discrete, wearable button that is programmed to alert friends, family members, and campus police
- A complimentary smartphone app that manages student's preferences for notifications and tracking
- A comprehensive business and financial plan for producing physical products

Achievements:

- Won competition among dozens of teams and six semifinalists who presented to venture capitalists
- Identified an underserved market need in college campus in need for a real, permanent solution
- Co-founded a startup (GoSafely, LLC) that has now earned almost $20,000 in funding and high-praise

Hardware renderings:

- *Users slide open and press the shielded blue button. Pressing the button once alerts friends and family. Pressing the button twice alerts local police through Wi-Fi or a cellular network.*
- *The device can be added to a keychain for discrete and easy access in times of emergency.*

Mobile app:

- *Users can manage their Safely tags from their mobile phones through a Bluetooth connection.*
- *Users can also trigger a more specific safety warning (e.g. EMS) from their mobile app. After an event is triggered, the Safely web API is notified and interested parties can track a user's location in real-time.*

Technologies used:

- Ionic Framework
- AngularJS in TypeScript + HTML/CSS
- SolidWorks CAD + 3D Printing

Twitter Sentiment Analysis

Use self-labelled tweets, linguistic analysis, and machine learning to understand language

Devpost:
https://goo.gl/te0TYy

Motivation:

- This United States (in particular) has extremely high costs for healthcare
- The public is gaining more and more interest in mental health care as a national and personal priority

What I created:

- A pipeline to gather tweets on two opposing topics to understand users' sentiment towards them
- A demonstration of this concept in action by trying to identify those users who use depressive-indicative language
- Useful to help find people in need of mental health care, to help marketers craft their messages, to identify long-term trends in user's mental health

Pipeline overview:

1. **Data collection**: Collect nearly 4,000 tweets from the Twitter Developer API and label them based on their hashtag. For example, tweets containing "depressed" (or related hashtags) will be labelled as belonging to the "depressive-indicative" class; tweets containing "happy" (or related hashtags) will be labelled as part of the "non-depressive-indicative" class.
2. **Under the user's position in the Twitter community**: Call the Twitter API to gain information about the user's followers, followees, average retweet counts, and more.
3. **Data analysis**: Send each of the 4,000 tweets to IBM Watson's Tone Analyzer API to gain more dimensions of information about each tweet.
4. **Classification model**: Use the labelled data to discriminate (with a machine learning algorithm) between tweets that are "depressive-indicative" or not in terms of their language characteristics. Train classification model with scikit-learn's k-Nearest Neighbors imp
5. **Understand an unknown user**: Given an unknown user, provide visualizations and a classification of their Twitter tweet language.

Technologies used:

- Django web framework
- scikit-learn
- chart.js
- Material Bootstrap
- IBM Watson intelligence APIs

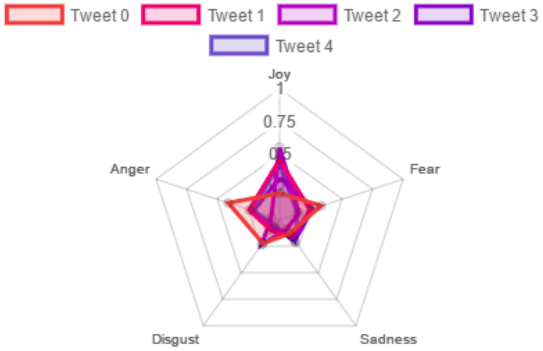
Project in motion:

Analyzing tweets for @barackobama

Profile overview

- Followers: 77510571
- Followees: 634144
- Tweets/day: 4.3833
- Average favorites: 0.0500
- Average retweets: 1878.0950

IBM Watson Tone Analyzer
Emotional tone



Tweet-focused analytics @barackobama

Senate leaders have blocked Judge Garland's hearing for over six months now. Keep pushing: https://t.co/peV6aCYswa #DoYourJob

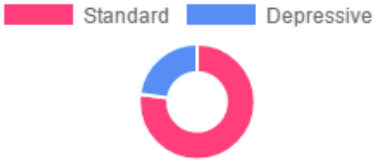
Word count: 70 | Retweets: 625 | Favorites: | #1 | @0

Depressive: No

Senate leaders need to work for the good of the American people, not seek out political points. https://t.co/Tdx3xk6gYi

Word count: 72 | Retweets: 1753 | Favorites: | #0 | @0

Depressive: No



Overall classification

From his/her language and status within the Twitter community, **@barackobama** is likely Ambiguous (56.57)

On a scale of 0 (indicative) to +100% (standard) for this particular class with an 85% accuracy.