Team Name: Insert Team Name Here
Members: Daniel Anderson (d563a309@ku.com), Brandon Caudell (b851c341@ku.edu), Zach Williams (z035w745@ku.edu), Dustin Wendt (dustinwendt@ku.edu), Gabby Gasser (grgasser@ku.edu), TJ Barclay (tjbarclay@ku.edu)

Team Meeting time: 4:00 Wednesday
Lab Meeting time: 2:45 Wednesday
Contact: Brandon Caudell (b851c341@ku.edu)
Project Sponsor: None

Project Description:
Our project is to create an Android and/or VR application that allows for virtual graffiti. Users will be able to walk around in a simple augmented reality view, leaving publically-viewable artwork. For instance, a user might go to Eaton, and draw “Engineering Rocks!” on the wall. A second user should be able to then go to Eaton and look at the same wall (through either a VR product or the camera’s phone) and see the drawing. The social aspect of this application could be very appealing, as it allows a collection of users to turn a public space into an ever-changing display. From this basic idea, we could branch out in a number of different functionality directions depending on what we think might be valuable to a user base.

Project Milestones
1. Our first milestone will entail a user being able to walk to a location, drop a text message, and other users will receive a notification that there is a message nearby when they are within some radius of it. The notification should also read out the contents of the text message. The distinct functionality bits for this milestone are:
   a. Geo-location of the user
   b. User interface for entering a text message
   c. Having a storage location for the location-message pairs
   d. App interaction with the aforementioned storage location
   e. A periodic check in the app for the user being in range of a message
   f. Interface to show the text from the message, and possibly its location as well
2. The next milestone will expand on the first by changing the message from textual to an image. This will require the following changes:
   a. Data store must now be able to store image data, and the interactions with it will likely need to be changed due to higher data transfer volume
   b. Allow the app to open the user’s camera and upload an image
   c. Display the nearby image (still in a static form -- no AR yet)

3. Our third milestone consists of taking the images from the previous one and processing them to eventually render in an augmented reality environment, the following pieces of functionality being key:
   a. Reading of the user’s gyroscope and compass data
   b. Calculation of the 3D orientation of the phone from the above data
   c. Calculation of distance between user and image (for image scaling)
   d. Determination of how much (if any) of the image is in the user’s field-of-view
   e. Clipping and transformation of the image to meet the expected perspective of the user
   f. Overlaying the transformed image on top of the live camera feed, creating AR

4. Our fourth milestone is to use the transformed image from the third milestone to overlay the image onto the user’s camera feed to simulate augmented reality.
   a. Implementation of a “user complaint” system to help filter out inappropriate content from the app

5. The fourth milestone would be fairly small by comparison. Once the previous one is implemented, we would want to create a drawing interface so that the uploaded images are no longer photographs from the camera, but artwork drawn on the touch screen.

6. Once the core functionality is implemented, there are a number of different expansions to the app that we can work on, time permitting:
   a. User approval or disapproval of artwork
   b. Ability to “follow” artists who the user likes, and see where more of their artwork is located
c. A “private group” system, allowing artwork to optionally be private to within the group it was posted in

d. Incorporate a virtual reality app that pairs with ours, perhaps acting as a kind of dynamic showcase of artwork around the world

e. Additional drawing methods:
   i. Holding the phone as a paintbrush, tracking movement using the accelerometer, and translating that into an image
   ii. Using the phone as a “spraycan” to paint an image
   iii. etc

- Estimated completion date for each milestone
  - 1. October 17, 2016
  - 4. February 14, 2017
  - 5. March 17, 2017
  - 6. April 20, 2017

Project Budget

The cost of the project is still being determined. There are two potential sources of cost: server hardware/operation, and VR tech should we decide to go that route. We will certainly need some server architecture to host the data storage and manage interfacing with users. This could either be owned and maintained by the group, or rented from a service such as Amazon Web Services. We are currently discussing the pros and cons of each option, as well as doing research on pricing. If we opt for a VR setup, then we may or may not need to purchase hardware for it. We are aware that KU does have a reasonable amount of virtual reality equipment maintained by Professor Gill, and so we may be able to use some of that. This phase of development would not be until much later in the lifecycle of the project, so we have time to look into this before diving in.

Work Plan
We have essentially three (fluid) roles in this project. We will have two front end developers (Zach and Gabby), two VR/image specialist (TJ and Brandon) and two database/back end developers (Dustin and Dan)

These roles are somewhat fluid, and all of us will be participating in documentation and research.

Github link

- [https://github.com/bcaudell95/SeniorDesign](https://github.com/bcaudell95/SeniorDesign)