Canvas LTI Student Climate Dashboard

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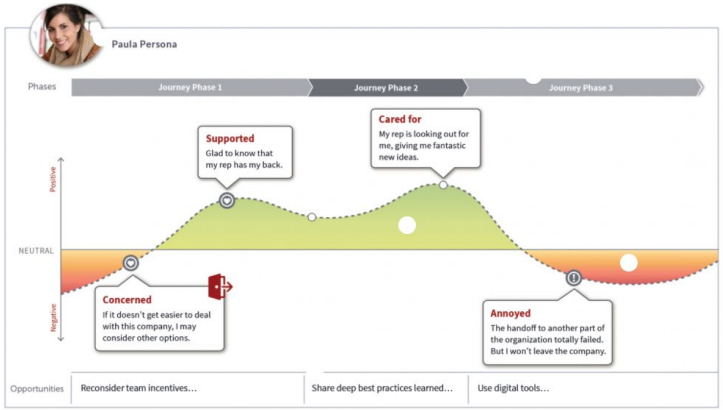
Project Plan

Terms and Definitions

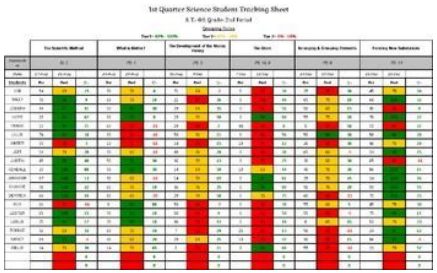
- Persona - A overreaching behavioral type driven by a defining set of characteristics. Used to generalize a group of similar students and model their responses to crafted scenarios.
- Resonance - The level of impact the class has on a student and their academic or professional career. Note that this can be positive or negative.
- Journey Map - A visual representation of a student's experience throughout the duration of the class. The x-axis represents time, discretized as a series of events. The y-axis represents the resonance of the class with the student.



Problem Statement

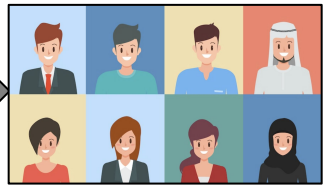
Canvas lacks the tools needed to do extensive data analysis on class progression and student sentiment throughout the semester on a class-by-class basis.

We want to allow instructors to take advantage of the large amounts of data available to improve their classes for better student learning.

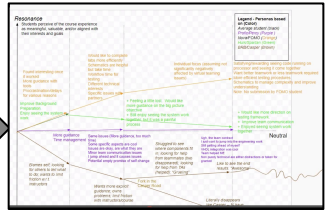


https://www.pinterest.com/pin/81768549478266387/

Canvas LTI Student Climate Dashboard



Persona Creation & Identification



Resonance Prediction & Journey Map Creation

Why It Matters:

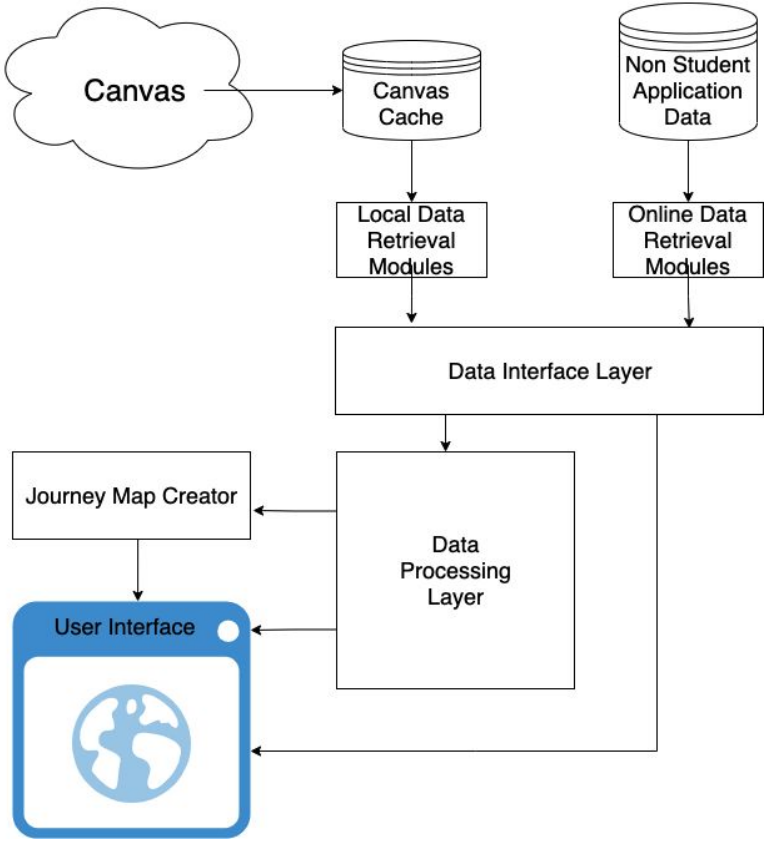
- Instructors looking for continuous student responses and feedback have to go through this evaluation process manually.
- Time consuming, and must be manually updated for new feedback.
- Project aims to serve as a tool for instructors, drastically reducing the time spent building/maintaining journey maps.
- More time evaluating and interacting with feedback.

https://www.hhilifting.com/manual-vs-automated-material-handling/

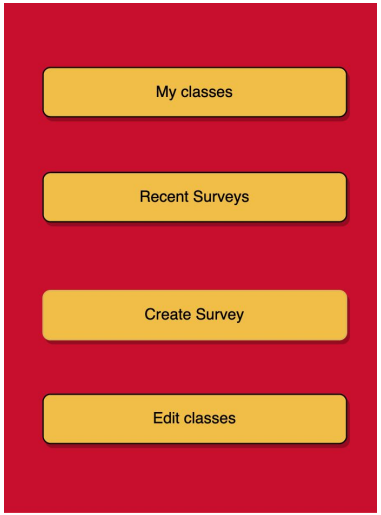
Application Overview

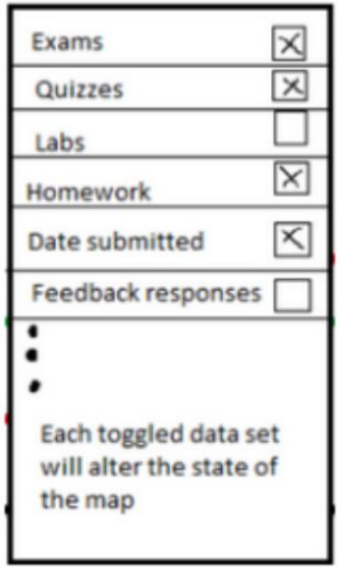
Key Application Components:

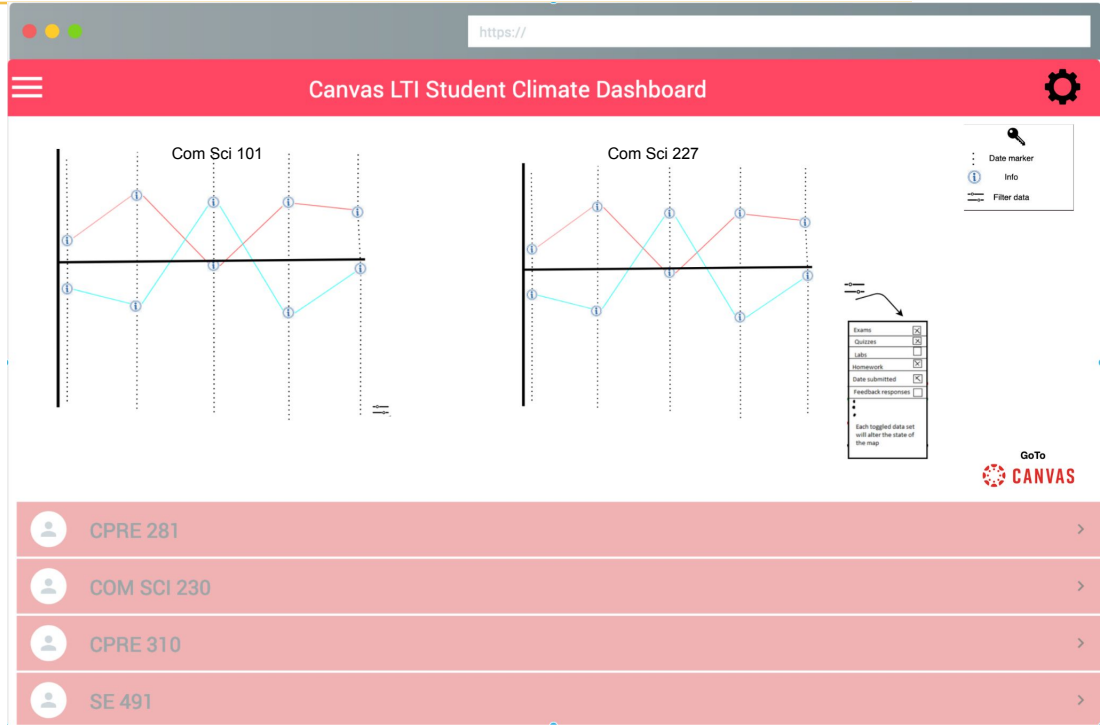
- Local Cache
- Online Database
- Data Retrieval Modules
- Data Interface Layer
- Data Processing Layer
- Journey Map Creator
- User Interface (UI)



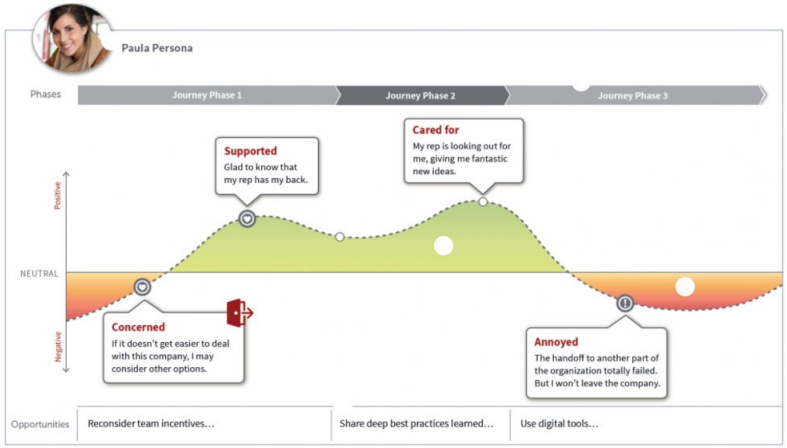
Conceptual Sketch







Functional Requirements



heartofthecustomer.com/customer-experience-journey-maps/

https://www.wakefly.com/blog/using-buyer-personas-to-improve-enrollment-and-graduation-rates/

Non-Functional Requirements

https://medium.com/@nikki_ecommgeek/microservices-and-why-your-business-needs-it-95b15df09adf

FERPA

Family Educational Rights & Privacy Act

https://www.miad.edu/college-services/academic-services/registration-services/ferpa-rights

1. All students, TAs, and Professors should be able to access the application with no crashes
2. Data integration should be modular for future extensions
3. Student's data should not be accessible by other students
4. Data Storage should not violate FERPA

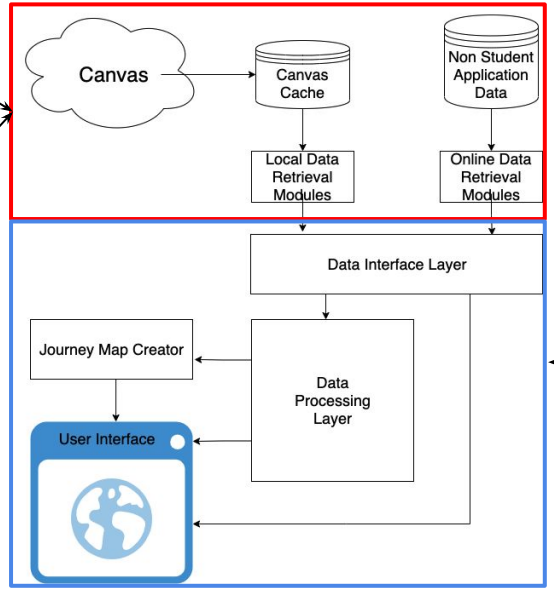
5. The system should be modular
6. The system should be easily extensible
7. The system should be able to use mock data
8. The system should be accessible at all times
9. The system should update the Journey Map with a 1s max delay
10. The system should use open source datasets in the absence of actual data for training (i.e. sentiment analysis)

11. A journey map should be cold constructed within 60 seconds.
12. A journey map should be warm constructed within 5 seconds.

Technical Constraints/Considerations

https://www.istockphoto.com/illustrations/rabbit-running

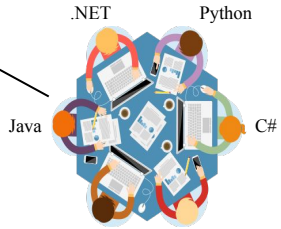
https://www.techandtrends.com/how-secure-is-your-data/



Microservices

https://comunytek.com/en/introduction-to-microservices/

https://medium.com/@nikki_ecommgeek/microservices-and-why-your-business-needs-it-95b15df09adf



https://www.fusionhit.com/how-to-successfully-manage-a-nearshore-dedicated-development-team/

Market Survey

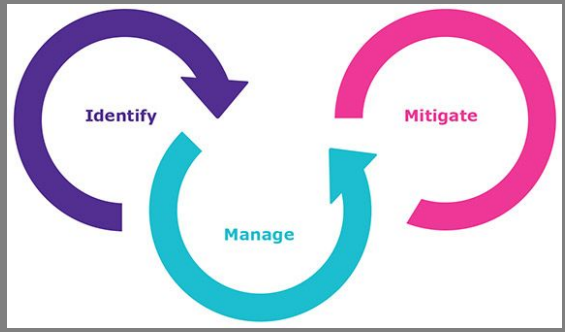
There are other data analytics tools available (MyLA from Unizin & Michigan State), but no software tool currently exists that predicts resonance and creates visualizations.

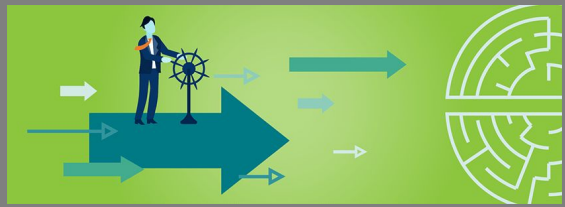
https://martechtoday.com/amex-acxiom-create-prediction-engine-based-purchase-data-206072

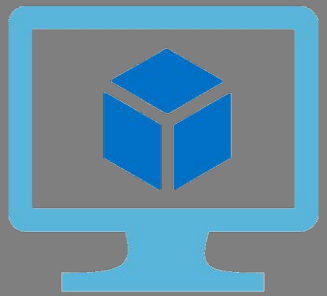
https://blog.prototypr.io/getting-it-right-why-infographics-are-not-the-same-as-data-visualizations-a23da7de745e

Potential Risks

Task	Risk	Mitigation	Estimate Probability
Infrastructure Complete	Infrastructure Machine becomes inaccessible/goes down for outside reasons.	Create Cluster/Machine using the Infrastructure-As-Code approach to make the entire cluster portable	0.10
Backend Setup	Data gets deleted out of database	Keep backup copies in Git	0.20
Backend Setup - Design	Exact data we will be hosting is not known until late in development	Break up the data into tables/schemas that use primary keys to connect data we know will be in there to any data added later	0.75







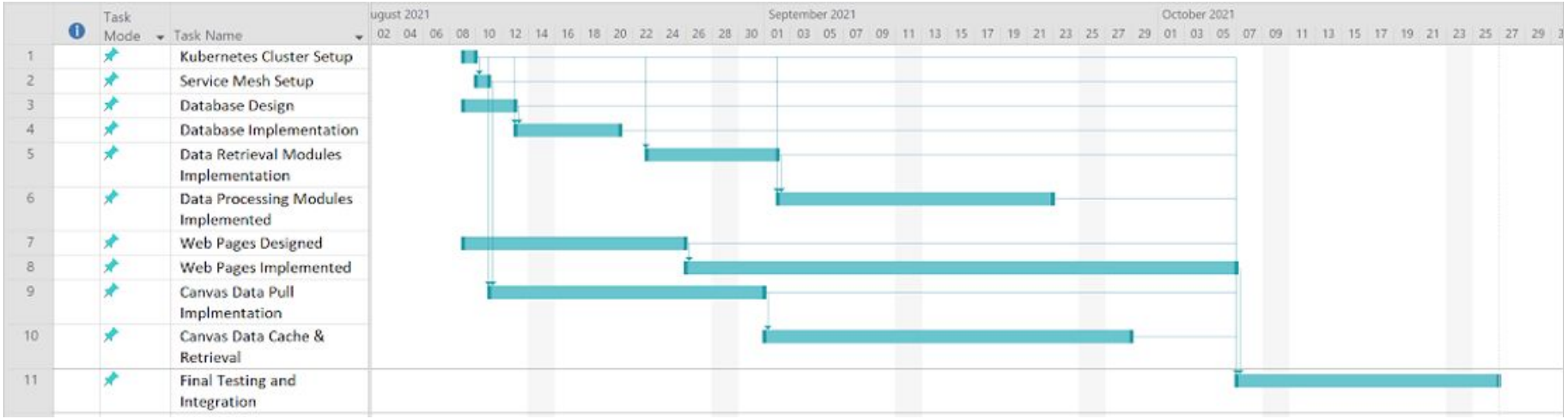
Resource/Cost Estimate

Cost Estimate: Absolutely Free

Resources:

- Virtual Machine from ISU ETG
- Mock Class Dataset from Advisor & Client for Resonance Prediction
- Libraries and Modules used are free
- Open Source Dataset: Amazon Reviews

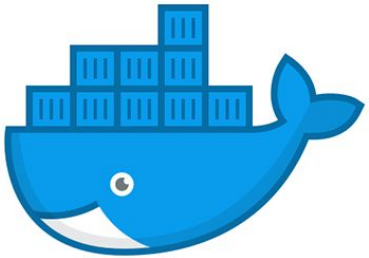
Project Schedule



System Design

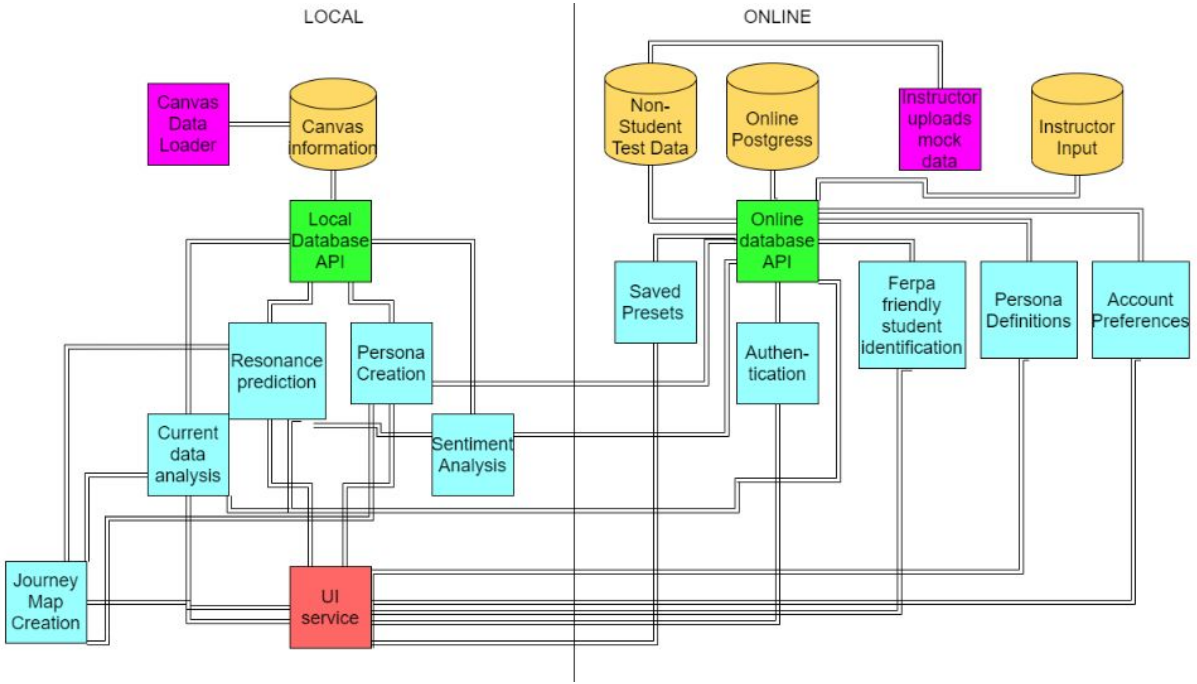
System Requirements

- In order for the application to be able to run on any local machine, there are a few system requirements.
- The machine must be able to use docker/kubernetes to run the application
- VM needs a minimum of 2g of memory and 2 cpu cores.



Functional Decomposition

- Separate online and local systems
- APIs to handle all data
- Intermediate services to utilize the data
- UI services to compile and present on the application



System Analysis

- Main users are ISU professors
- Users want to have access to in-depth class data analysis
- System should be usable across separate instances on the same device
- System should be consistent across multiple devices

Inputs & Outputs

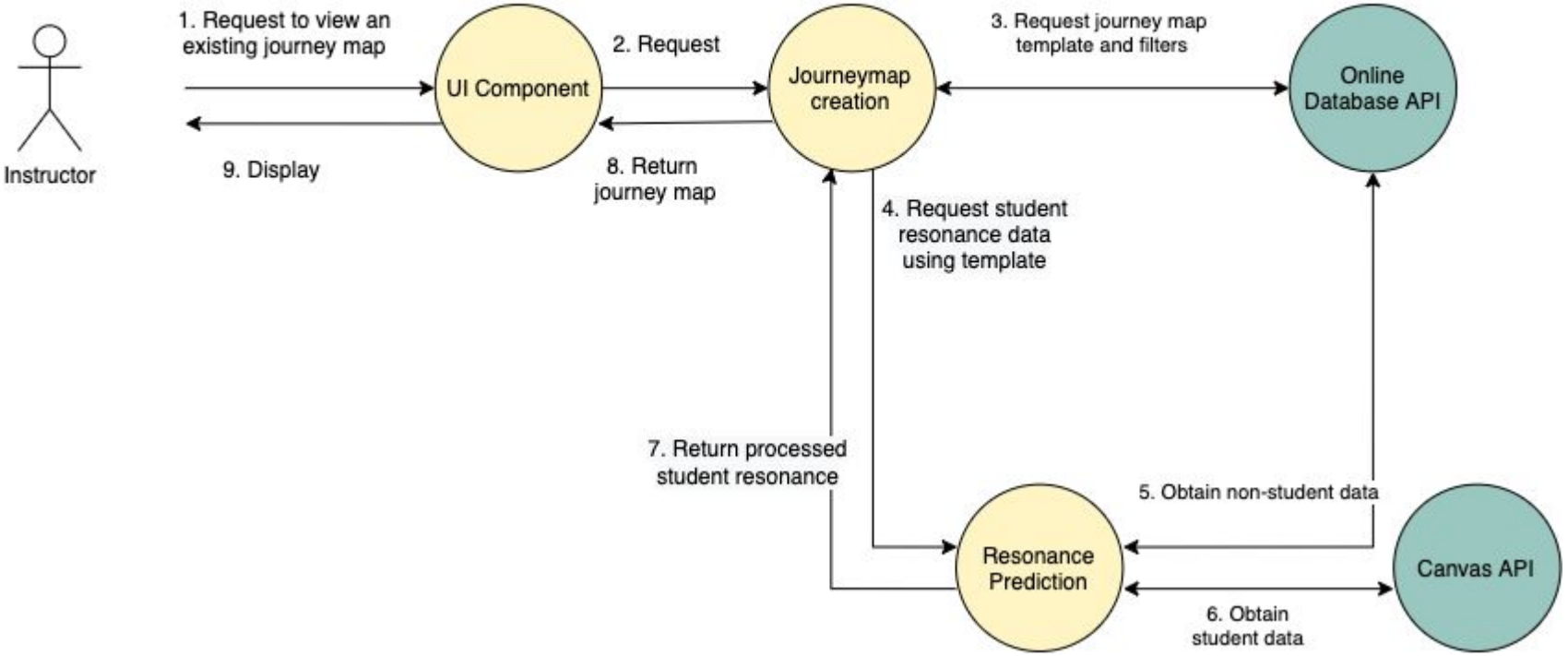
Inputs:

- Canvas API - used to request data from student-submitted feedback and other student/class information.
- Online Postgres Database - custom settings created by the instructor and tied to their account.

Outputs:

- Aggregations and groupings of student feedback (into personas, mappable to journey maps)

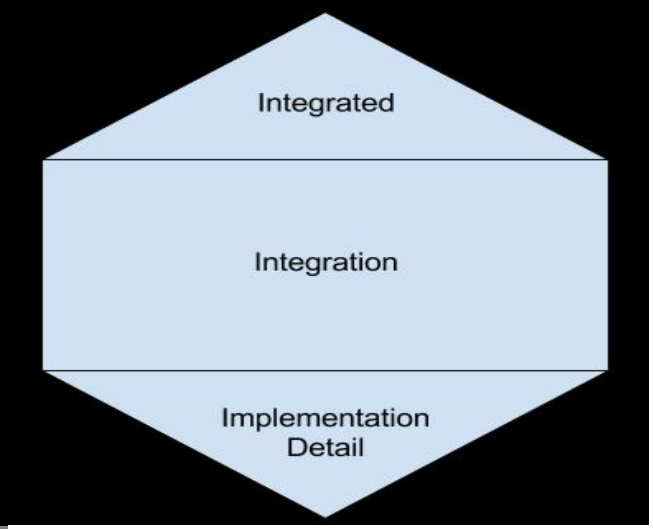
Flowchart to view an Existing JourneyMap

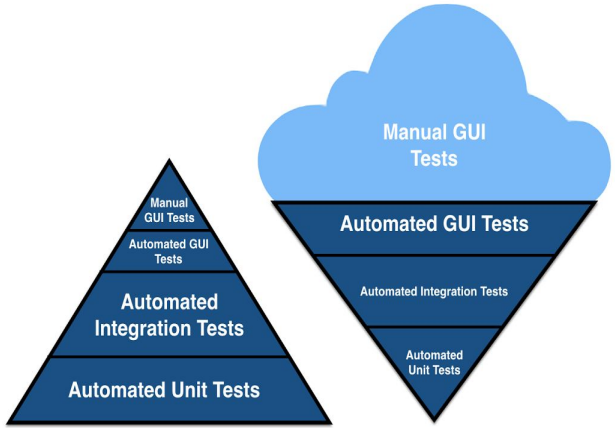


User Interface Specifications

User interface is hosted locally using Docker.

- GUI will exist as a local web page, which easily suits containerization.
- Accessible interface design
- User's account stores presets - applied to future sessions
    - May implement some UI customization settings that can be associated with the user.





Testing Patterns/Frameworks

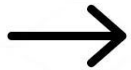
- Honeycomb pattern for microservices.
- UI acceptance testing with Selenium.
- Manual API QA with Insomnia.
- Automated unit/integration testing with JEST.
- Request Validation with JOI.
- Mutation testing with Stryker.

Mutation Testing With Stryker

- What is a mutant?
- Most tests are poorly designed.
- Can be used on all our unit tests.Specifically on data.

```
function isUserOldEnough(user) {
  return user.age >= 18;
}
```

```
/* 1 */ return user.age > 18;
/* 2 */ return user.age < 18;
/* 3 */ return false;
/* 4 */ return true;
```



```
Mutant killed: /yourPath/yourFile.js: line 10:27
Mutator: BinaryOperator
-                   return user.age >= 18;
+                   return user.age > 18;

Mutant survived: /yourPath/yourFile.js: line 10:27
Mutator: RemoveConditionals
-                   return user.age >= 18;
+                   return true;
```

Conclusion

Current Status

- Requirements identified
- Information regarding personas collected
- Architecture choice finalized
- Initial design sketch created
- Visual prototyping of application UI created and feedback received
- VM reserved from IEG
- Docker set up

Task Responsibility

- Kira - Accessibility Manager, Creative (UI) Design
- Emma - Creative (UI) Design, Integration Manager, Scribe
- Joshua - Customer Contact, Meeting Facilitator, Infrastructure Manager
- Zach - Assignment Wrangler, Test Engineer, Project Manager
- Andrew - Slack Manager, Meeting Scheduler, Test Engineer

Plans

We intend to start working on code during the summer, and as we get into the new semester, we will work to complete our milestones and make our way to a useable product.

Questions?

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Unit or Department Name Here

Have no fear! The room you're looking for is right here.

Presentation Title

PRESENTATION SUBHEAD (ALWAYS ALL CAPS)

Presenter Name 1, Presenter Name 2, Presenter Name 3

Section Title

This is a content page with a sidebar photo on the left-hand side. This type of page is useful for larger bodies of text, namely paragraph length pieces. Use this type of page for certain types of content such as extended quotes, introductory paragraphs for presentations, and other long-format pieces when absolutely necessary.

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Functional Requirements

Professors should be able to:

- View class Journey Map
- View individual student's Journey Map
- CRUD their own data/feedback metrics
- CRUD Journey Maps
- CRUD data groups
- CRUD Journey Map filters

The System should be able to:

- Pull data directly from Canvas API
- Accept and use data provided from users
- Predict how a given persona will respond to a given class outline
- Create personas on a per-class basis
- Convert student and class data into Journey Maps

Technical Constraints/Considerations

Most Limiting Decisions:

- Partly Locally Hosted Application
- Containers & UI Pairing
- Microservice Communication Lag
- Microservice Communication Security

Most Opportunistic Decisions:

- Infrastructure as Code (IaC)
- Microservice Modules & Containers
- Containers & Databases Ephemerality

kubernetes