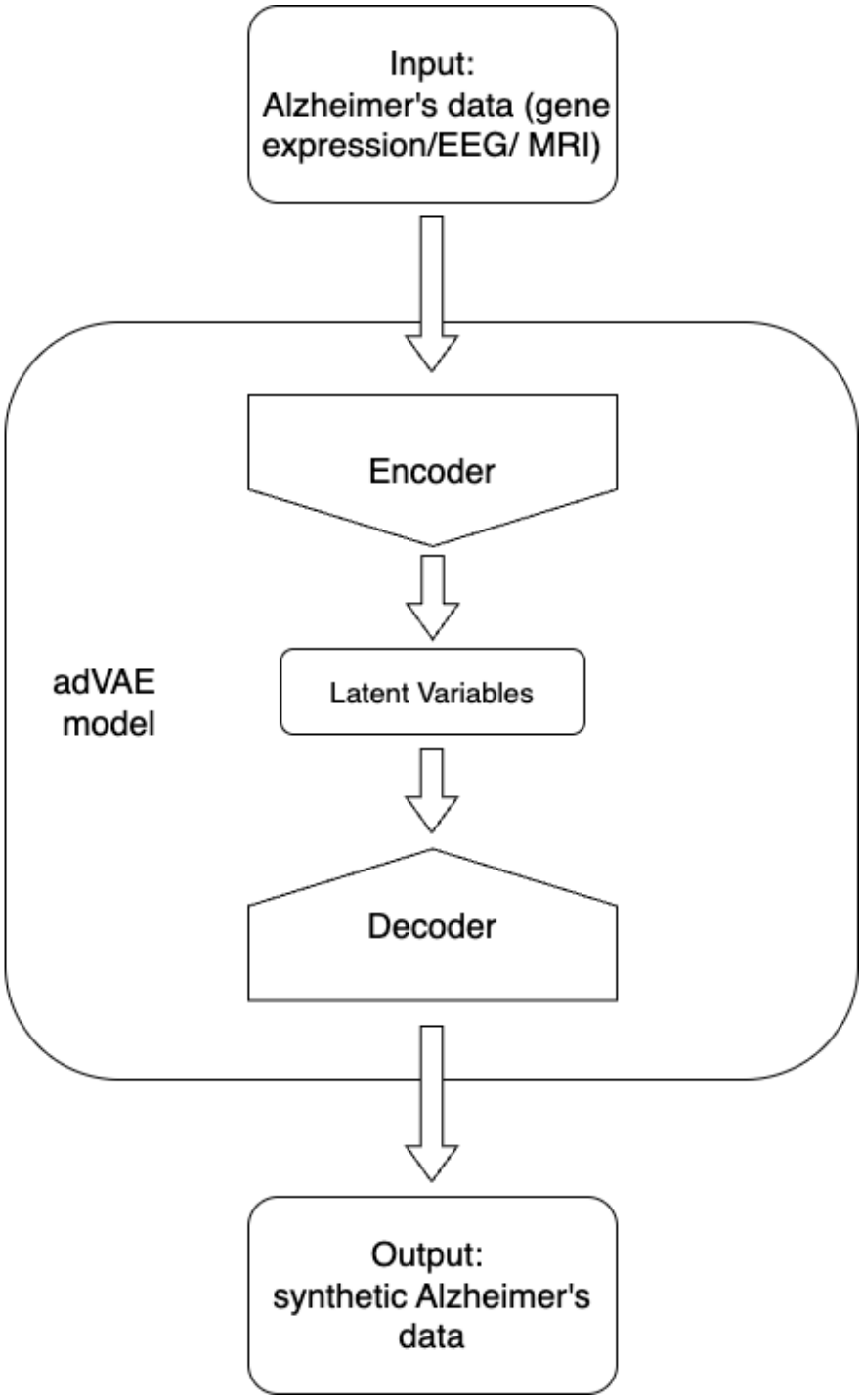


Model Architecture

Functional Description
adVAE aims to: 1. Aid Alzheimer's research by creating high-quality multimodal synthetic data (gene expression, EEG, MRI) 2. Easily integrate with existing biomedical workflows

User Interface
Command line interface (CLI)

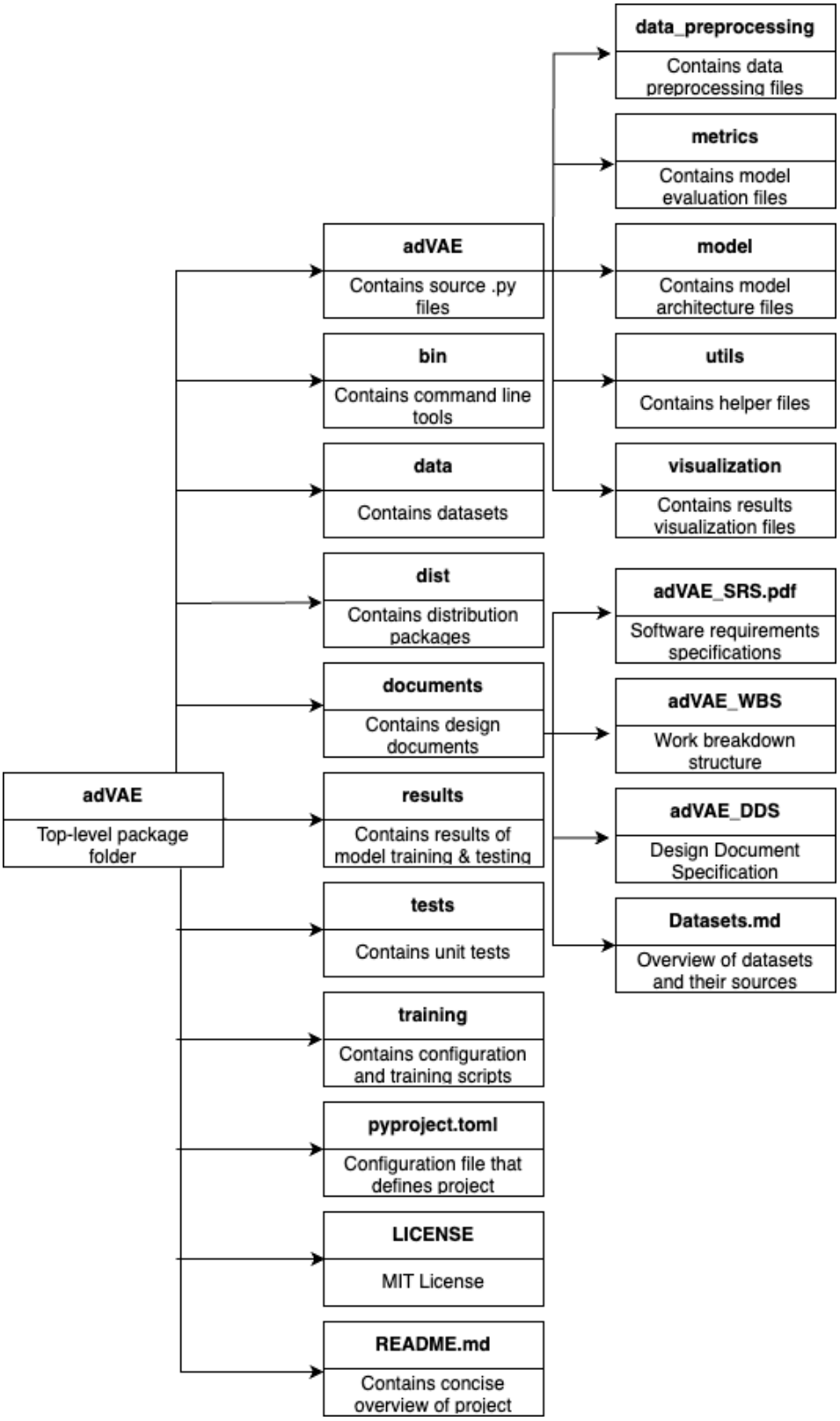
Functionality
1. Preprocess input data used to train the VAE 2. Latent space representation of various data modalities 3. Generation of synthetic data using latent space variables

Task Prioritization
1. Identify example data (gene expression, EEG and MRI) 2. Create VAE model architecture for one modality (gene expression) 3. Train the model using the example gene expression dataset 4. Perform latent space optimization 5. Validate the results by calculating KL loss and reconstruction error of generated dataset 6. Extend the model to include other modalities 7. Train, validate, and test the model using the bulk data

Goals and Milestones
1. Finish all design documentation 2. Set up GitHub repository 3. Create modules 4. Start implementing code 5. Create model for one modality 6. Extend model for other modalities 7. Peer review 8. Refine model and update design documentation

Solutions
1. Tensorize all input data 2. Create separate modules/classes for handling different data modalities 3. Validate by calculating KL loss and reconstruction loss

DDS



Module Structure

Tasks	Week 1 (02.03 - 02.09)							Week 2 (02.10 - 02.016)							Week 3 (02.17 - 02.23)							Week 4							Week 5							Week 6							Week 7							Week 8						
	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su	M	T	W	Th	F	S	Su
Create SRS																																																				
Create Datasets.md																																																				
Create WBS																																																				
Create Timeline																																																			
Create DDS																																																			
Identify data sources																																																			
Validate data																																																			
Implement first function																																																			
Split dataset into example-training-validation-test data																																																			
Perform data preprocessing for gene expression data (normalization, scaling, handling missing values)																																																			
Perform exploratory statistical analysis on the example data																																																			
Visualize the example data																																																			
Construct the VAE architecture																																																			
Set up hyperparameter tuning, backpropagation and training functions																																																			
Set up loss functions and other validation metrices																																																			
Train and test model on example dataset																																																			
Evaluate reconstruction quality																																																			
Optimize latent space for gene expression VAE model																																																			
Adapt model for MRI data																																																			
Adapt model for EEG data																																																			
Validate using full training, validation and test data																																																			
Develop Command Line Interface for adVAE																																																			
Update all design documentation																																																			
Summarize key findings																																																			
Prepare for peer review																																																			
Present findings																																																			

Timeline