GEOG 575 Final Project Proposal

1. Persona Sarah Chen is a 35-year-old Emergency Management Coordinator for Riverside County, California, with 8 years of experience coordinating evacuation plans during wildfire season. She holds a Master's in Emergency Management and has high domain expertise in fire behavior and evacuation protocols, plus moderate GIS skills and comfort with web-based emergency management tools. Her primary needs focus on real-time risk assessment, efficient evacuation route planning, and public communication during critical situations. Sarah's goal is to minimize civilian casualties and property damage during wildfire events. Her key objectives include assessing current fire risk levels across geographic areas, identifying optimal evacuation routes by analyzing road networks and population centers, and monitoring resource deployment through emergency asset tracking. She requires insights into which areas face immediate threat, which routes remain viable under changing conditions, and where resources should be positioned for maximum community effectiveness. The application must prioritize real-time data integration, clear risk visualization, and rapid route analysis to support time-critical decision-making.

2. Scenario At 6:00 AM during a Red Flag Warning with 40+ mph winds and 10% humidity, Sarah opens the Wildfire Risk & Evacuation Planner for her morning risk assessment. She identifies current fire weather conditions by clicking weather station markers to view wind speeds, direction, and humidity readings. Using the temporal slider, she reviews the next 24 hours and notes that winds will peak around 2:00 PM. The system automatically updates fire risk surfaces based on current weather data, displaying high-risk areas in red gradients over the terrain basemap. Noticing elevated risk near Eagle Mountain subdivision, Sarah filters the population layer to highlight vulnerable residents and identifies three evacuation routes using the Route Analysis tool. She selects Eagle Mountain as origin and evacuation centers as destinations, generating optimal routes with travel times and capacity constraints displayed in different colors. Sarah then retrieves historical fire data using temporal controls, arranging a side-by-side comparison of today's risk surface with conditions from a major fire two years ago, revealing similar patterns. Based on her analysis, she exports a risk assessment report and uses the notification system to issue a pre-evacuation advisory to Eagle Mountain residents. Throughout the morning, she monitors changing conditions through live weather feeds, ready to escalate to mandatory evacuation if fire ignitions occur in high-risk zones.

1. Representation

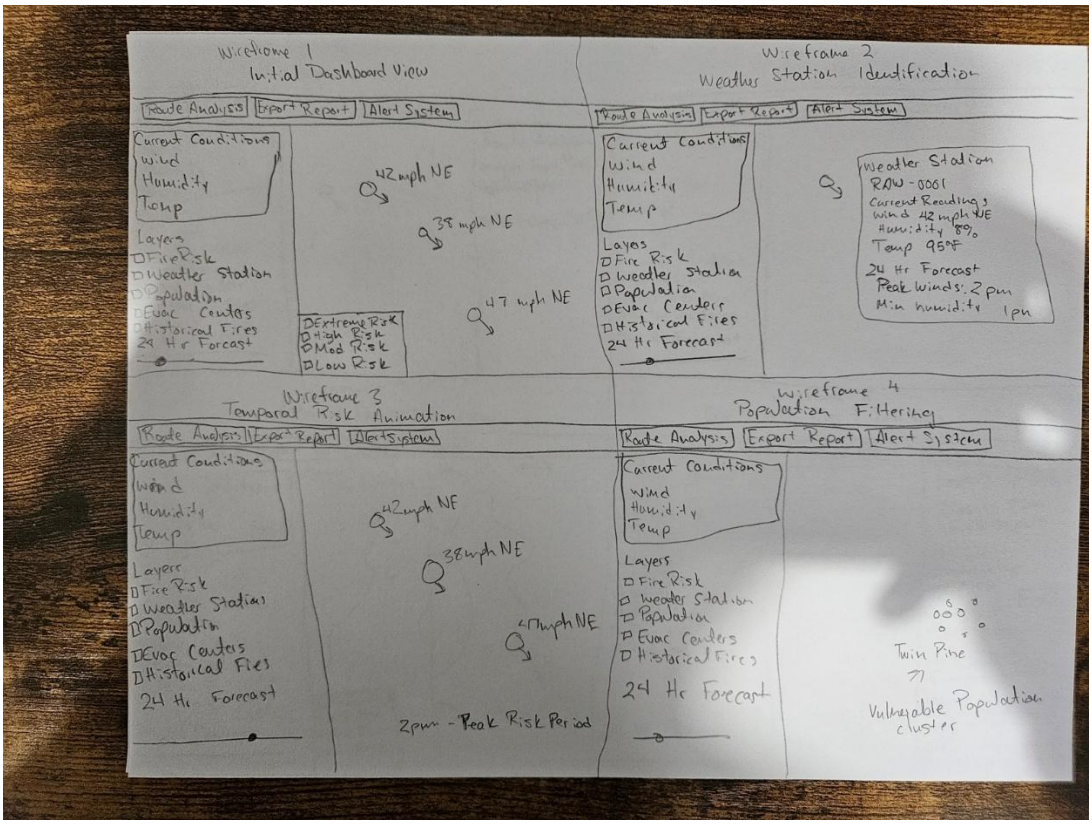
Layer Title	Data Source	Proposed Symbolization
Terrain Basemap	USGS 3DEP Elevation	Hillshade relief with elevation color ramps
Fire Weather Stations	UC IPM Weather Data	Point markers with wind direction arrows, color-coded by wind speed
Current Fire Risk Surface	Custom weather model	Dynamic heat map overlay with red gradient intensity
Active Fire Perimeters	InciWeb	Bold red polygon outlines with semi-transparent fill
Road Network	OpenStreetMap	Line symbols by road type (highways: thick blue, arterials: medium gray)
Population Density	US Cities CSV	Graduated circles scaled by population size
Evacuation Centers	Local emergency databases	Blue shield icons with facility names
Historical Fire Footprints	CAL FIRE Database	Semi-transparent orange polygons with year labels

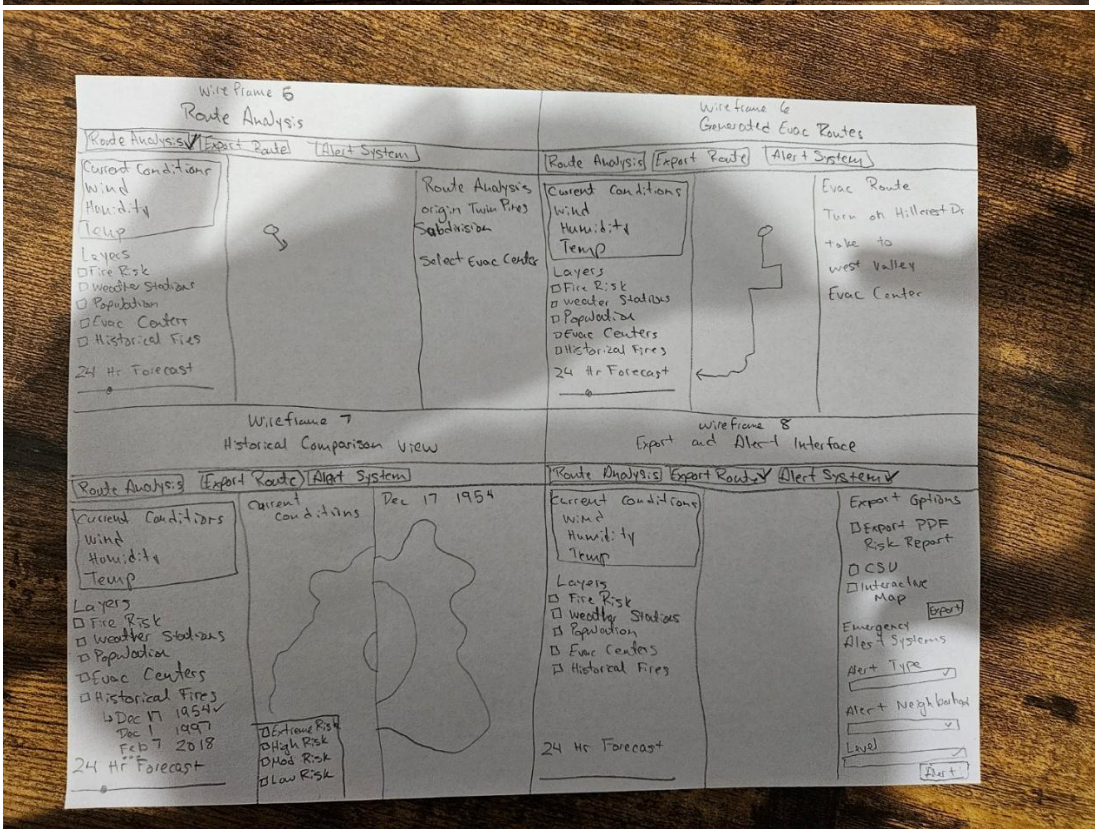
2. Interaction

Function Title	Operator: Operand	Interaction Behavior & UI Design
Weather Station Query	Identify: Location	Click markers to display popup with weather data
Temporal Risk Animation	Sequence: Time	Time slider to animate 24-hour fire risk forecast
Risk Level Filtering	Filter: Attribute	Dropdown to show high/medium/low risk areas only

Function Title	**Operator: Operand**	**Interaction Behavior & UI Design**
Evacuation Route Planner	Calculate: Network	Click origin/destination to generate optimal routes
Historical Comparison	Compare: Time	Split-screen view with historical vs current data
Layer Visibility Toggle	Overlay: Layer	Checkbox controls to show/hide layers
Risk Assessment Export	Export: Map	Generate PDF report with current analysis
Emergency Alert System	Retrieve: Information	Panel for composing evacuation notifications

Wireframes


Wireframe 1
Initial Dashboard View
Route Analysis
Export Report
Alert System
Current Conditions
Wind
Humidity
Temp
Layers
Fire Risk
Weather Station
Population
Evac Centers
Historical Fires
24 Hr Forecast
42 mph NE
38 mph NE
47 mph NE
Extreme Risk
High Risk
Mod Risk
Low Risk
Wireframe 2
Weather Station Identification
Weather Station
RAW - 0001
Current Reading:
Wind 42 mph NE
Humidity 8%
Temp 95°F
24 Hr Forecast
Peak Winds: 2 pm
Min humidity 1pm
Wireframe 3
Temporal Risk Animation
42mph NE
38mph NE
47mph NE
2pm - Peak Risk Period
Wireframe 4
Population Filtering
Twin Pine
Vulnerable Population cluster


Wireframe 5
Route Analysis
Route Analysis
origin Twin Pines Subdivision
Select Evac Center
Wireframe 6
Generated Evac Routes
Evac Route
Turn on Hillcrest Dr
take to
west Valley
Evac Center
Wireframe 7
Historical Comparison View
Current conditions
Dec 17 1954
Dec 1 1997
Feb 7 2018
Wireframe 8
Export and Alert Interface
Export Options
Export PDF Risk Report
CSV
Interactive Map
Export
Emergency Alert Systems
Alert Type
Alert Neighborhood
Level
Alert