Gustavo Hattenhauer Gomes

Data Engineer

Rua Martinho de Haro, 743,
Ingleses
Florianópolis, Santa Catarina,
Brazil
+55 48 9 9654-1908
hgomes.gustavo@gmail.com

(21) Gustavo Hattenhauer Gomes | LinkedIn

gustavo-gomes-ghg (GHG Tecnologia) (github.com)

PROFILE

Software Developer, Data Engineer and Oceanographer, experienced in Earth science solutions.

I am currently technology manager, leading a team of 17 people. I have experience with data engineering, data analysis, statistics, time series manipulation, matrix and specialized data manipulation, web programming, mobile development, and geoprocessing.

Good communication, teamwork, problem solving instinct, proactive and determined.

My biggest motivation is to encounter complex challenges. Those in which it is necessary to understand the process and know the variables to solve the problem. Nothing is impossible, because for everything there is a way to do it.

I'm currently looking for a Data Engineer or Backend developer position, where I think I'll have my best performance.

ENGLISH EXPERIENCE

Currently Level 5 of 8 in OpenEnglish and studying. Good pronunciation and reading.

CEFR A2 Certificate.

PROFISSIONAL HISTORY

During the last 5 years, I worked as data engineer, web and mobile developer and more recently as technology manager at Fractal Engenharia e Sistemas company, which has a market capitalization higher than U$ 2M/year and market value of U$ 4M. During this period, I hired and structured the current team of 17 people, in addition to software and data engineering development, increasing SaaS revenue from 0 to U$ 50K per month today.

I have 10 years of experience with programming languages, with best knowledge in Python, Matlab, Javascript, Java for Android. Also I have experience with DevOps activities, docker, AWS, Linux administration, web server apache/nginx, etc.

About operational systems, I've experience with waves, meteorological

SKILLS

- Python
- Matlab
- Data Analysis
- Complex Problem Solving
- Ocean and Meteorological Analysis
- Web Development

LANGUAGES

- **English**
- Portuguese

AWARDS

Best Navigation Channel - PIANC Copedec Nov 2016

and hydrological forecast systems.

In the last 3 years I completed postgraduate studies in Software Engineering and Ethical Hacking and Cybersecurity.

EMPLOYMENT HISTORY

Technology Manager, Fractal Engenharia e Sistemas

June 2019 - Present, FLORIANÓPOLIS

Technology manager, developing systems for Dam Safety and Hydrological Monitoring and Forecasting systems, leading a 17 people team.

Data Engineer for Hydrological Forecast Operation System, Fractal Engenharia e Sistemas

Apr 2015 - Present, FLORIANÓPOLIS

Hydrological pipeline, gathering scientific data from different sources, storing, processing, and developing an operational system.

Android Developer, Fractal Engenharia e Sistemas

Apr 2017 - Present, FLORIANÓPOLIS

Dam Safety App for manually monitoring auscultation instruments in dams.

Web Developer, Fractal Engenharia e Sistemas

Mar 2017 - Present, FLORIANÓPOLIS

Modular Single Page application with tools for Dam Safety, Hydrology Monitoring and Hydrology Forecast System. Written in AngularJS, migration to ReactJS with Single-SPA library. Backend with PHP + Symfony Framework, and Python + Django Framework.

Oceanographer, CB&I

Jun 2012 - Mar 2018, FLORIANÓPOLIS

Currents, waves and morphological numerical modeling for Environmental Impact Studies. Numerical Simulation with Delft3D, data analysis with Matlab, writing reports and team contributions.

Data Engineer for Stock prices system, Patada de Urso

Jan 2017 - Sep 2020, FLORIANÓPOLIS

Personal project developing robot trader in Metatrader 5 for day trade and swing trade operations. Also developed a single page application for follow Brazil stock graph analysis.

Data Engineer for Wave Forecast Operational System, ONDA

Jan 2014 - Dec 2015, FLORIANÓPOLIS

Wave forecasting operational system for southeast Brazil coast, simulating Wavewatch III and SWAN models.

Geoprocessing Specialist, Caruso JR

Mar 2011 - Mar 2012, FLORIANÓPOLIS

Map analysis, map/chart creator, field sample collect for Environmental Impact Studies. GIS Specialist with ArcGIS and QGIS.

EDUCATION

Cybersecurity and Ethical Hacking Postgraduate, UNICIV

Mar 2021 - Feb 2022, Remote

Software Engineering Postgraduate, UNYLEYA

Jul 2020 - Jun 2021, Remote

Oceanographer, UNIVALI

Jan 2005 - Jun 2010, Itajaí- Santa Catarina

Graduated with High Honors

PROJECTS

Patada de Urso API - *NodeJS and Sequelize*

May-2022 - PRESENT

Porting PHP classic API to NodeJS application using Sequelize ORM library. The API project includes CRUD features for +20 endpoints, integrated with Python scripts for creating images to make posts on Instagram.

Learning Outcomes
From this project I'm learning the main features of NodeJS and Sequelize ORM.

DBA maintenance in huge database

April-2022 - PRESENT

Database with 700GB size running out disk size space. To solve this problem, the main database was segregated in different databases, located in different servers, based on data time stamps (hot, buffer, cold). The 'buffer' database was used to store data for 3 months. After that period data is transferred to the 'cold' database and tables are cleaned. In 'hot' database are stored recent and highly queried data. Every day a routine is executed to transfer data older than Today-60 days to 'buffer' database, and remove this data from the 'hot' database.

Adaptations were necessary on application to query data from different databases and work properly again.

Learning Outcomes
From this project I'm improving my skills with PostgreSQL maintenance tools like vacuum and analyze, how to transfer data between databases performatically, how to execute maintenance processes in production without turning off the application, with less impact on database performance.

ETL Project - Meteorological radar data ingestion

Nov-2021 - Dec 2021

This project comprises gathering HDF5 meteorological radar data files from FTP site using a Python script and storing on a serving layer with structured PostgreSQL database.
HDF5 files are available every minute on FTP. Each file stores precipitation data on an 800x800 matrix. Each matrix pixel corresponds

to an area of about 600m², and the coverage radius around the radar installation site is about 240km. Rain data is extracted using the h5py library. Because of high density data, transformation is executed to represent averaged rain data on ~10km² area. After this process, the outcome matrix is saved on a structured scheme with columns representing longitudes, and rows representing latitudes. This approach was used to get more performatically queries on specific interesting areas.

Learning Outcomes
From this project I learned how to create a real proof to validate average rain data using plots with matplotlib and coordinates guidelines to check how many small pixels are contained in the area of a large pixel.

ETL and Data Visualization Project - Selenium Games — Personal project

Jan 2020 - Mar 2020

Games news portal, without ads. A web crawler python that parses html from game news portal sources, and shows in a web page like a news portal.

Project link: https://selenium.games/

The web crawler was builded to parse html from 3 game news portals (Techmundo, Voxel and GameSpot). The crawler is executed by crontab each 30 minutes, parses html to find some new articles and its information (article call image, title, date, source url), write a html object with information found (processed article), and make a post on MySQL structured database using PHP API. The processed articles are displayed on a simple and pure html/javascript website without advertisement. Each article is referenced to its source (a source logo is displayed above the call image), and clicking on the article link, the site redirects to the original game portal.

SPEHC — Operational Hydrological System Model

Jun 2015 - PRESENT

Operation hydrological forecast system, predicting river flow for hydroelectric power plant water reservoirs and flood/drought predictions for counties. This system is based on rainfall data ingestion from different sources and numerical model execution.

This system is executed by crontab, running once per day for each watershed monitored. On each execution, warmup and forecast rainfall data is gathered from a structured database, querying rows and columns only related to watershed geographic location, processed and prepared to input on a hydrology numerical model. The numerical model solves hydrology equations converting rainfall data into river flow prediction. Following, PDF bulletins are generated presenting rain and river flow outcomes, statistics, water reservoir hydraulic balance or river flood/drought conditions on interesting areas. Time series predictions are sent to cloud databases using API and PDF bulletins are sent to S3 storage. In the last step, customer users receive an email with main prediction information and link to PDF bulletins.

After model execution, the predictions to each watershed are available on a web platform (SIG²A) with charts and graphs to visualize results and

make analysis.

Project link: https://www.fractaleng.com.br/spehc-2/

Web platform manual: https://www.fractaleng.com.br/SIGA/user_guide/user/6-spehc/spehc-situation

ETL project and Data Visualization - Patada de Urso — Personal project

Mar 2018 - Nov 2018

Stock market analysis system based on graph analysis setup's. Development of a web platform for viewing and managing BMF/Bovespa paper entry signals. Platform in SAAS format, sending daily newsletters to customers.

A python script is executed by crontab, downloading stock prices on a daily basis from UOL API, saving time series on disk as a json file . After download, an analysis script is executed, load time series from json and apply business logic of 3 graph analysis/indicators (RFI - Relative Force Index, MACD - Moving Average Convergence Divergence, and Patada - a proprietary setup), compute stocks statistics, and send a email to customers with investment tips based on technical setups. This same analysis script also opens, closes and follows virtual positions based on setups. Statistical data, tips, and html body are sent to a structured database using PHP classic API (currently migrating to NodeJS). This data can be accessed on the web platform using the link below.

Project link: https://patadadeurso.com.br/

Hydrological data ingestion module — Algorithm

Fev 2017 - Mar 2017

Development of a data ingestion script to get ANA Telemetric Station data (National Water Agency) to be used on the SPEHC hydrological system. Script written in Python, get XML data from ANA API. The data is processed and a sql file is written to save river water level, flow and rainfall to a structured database.

Data ingestion module for GPM/NASA rainfall data — Algorithm

Development of the Rainfall data ingestion module from the GPM (Early and Late) (NASA) satellite constellation to be used on the SPEHC hydrological system as warm up data. Data ingested to structured databases whenever new data becomes available.

Data ingestion module for Weather Rainfall Forecast — Algorithm

Abr 2016 - Ago 2018

Development of data ingestion scripts (Bash and Python) for CPTEC/BRAMS, CPTEC ETA, CPTEC/WRF, GFS/NOAA and CFS/NOAA weather model results. Scripts are executed by crontab and download model results in GRIB2 file format from API or FTP site. Rainfall data is extracted, a sql file is written and data is saved on a structured database, on different tables for each data source. Database tables were designed to generate more performatically queries, with columns representing longitude coordinates, and rows representing latitude coordinates. This data is used as forecast data for the SPEHC hydrological system.

Data Ingestion module TRMM/NASA — Algorithm

Jul 2015 - Set 2015

Development of the Rainfall data ingestion module from the TRMM satellite constellation (NASA) to be used on the SPEHC hydrological system as warm up data. Automatic data ingestion to structured databases whenever new data is made available.

Wave Forecast Operational System — Personal Project

Set 2015 - Jun 2016

This was my first operational system developed and I'm very proud to have created it. Currently it is deprecated and offline, but it was here where I learned how to face and solve operational troubles.

Simple: Operational system for the execution/processing/upload and website to show WaveWatchIII wave forecast results for the Atlantic Ocean, nested with the shallow water wave prediction model SWAN for south and southeast coast of Brazil. Forecast data was then presented on a website. It is a system similar to Waves, SurfGuru, Broou, magicseaweed, surfline, amongst others.

With details: This project comprises a complete wave forecasting system for shallow and deep water. Scripts were developed to download wind, air pressure and ice concentration fields from meteorological model GFS/NOAA. These datasets in GRIB2 files were extracted and processed using C scripts, and written in ASCII file format to be input to the WaveWatch III deep water wave numerical model, with the entire Atlantic Ocean as numerical domain. The WW3 model was executed, generating results files. In the next step, plots of Hs, Tp, wave direction fields and wave spectral energy were created using Python Matplotlib library. These plots were uploaded to a cloud server. Following, the shallow water wave model (SWAN) was executed using spectral wave energy from WW3 as input to its domain, which comprises the south and southeast coast of Brazil. Time series results were sent to a structured database using PHP API. The final outcomes were wave prediction to mainly surf spots along the coast. These time series, maps and plots were displayed on a web platform.

This entire process was executed 4 times per day, scheduled on crontab,

and orchestrated by Python script, in a "server" located on my house, running Linux Mint OS. The web platform was hosted on Hostgator shared server on cloud.

DAMS App — *Android App*

Mar 2017 - PRESENT

Dam Safety App for manually monitoring auscultation instruments and performing dam visual inspections.

Project link: https://www.fractaleng.com.br/dams-app/

User manual (screen demonstration):

https://www.fractaleng.com.br/DAMS/user_guide/user/

Google Play link: https://play.google.com/store/apps/details?id=com.fractalengenharia.DamsApp

SIG²A — Web Platform

Mar 2017 - PRESENT

Web platform concentrating customer content, product outcomes, and analysis tools for Dam Safety and Hydrological situation/forecast.

Project link: https://www.fractaleng.com.br/siga/

User manual (screen demonstration): https://www.fractaleng.com.br/SIGA/user_guide/user/

Robots Metatrader 5 — Personal project - Algorithm

Ago 2017 - Jun 2018

Trader robots development for day trade operations in mini-index and mini-dollar contracts in Metatrader 5.

Notifymer — Personal Project - Android App

Jan 2017 - Fev 2017

App development for Android – Notifymer – Making programmer life easier (alpha version), available on Play Store. Receive Push notifications from any code/software on your smartphone. Before the Telegram channel it was very useful.

Project link: https://play.google.com/store/apps/details?id=com.ghgtecnologia.notifymer

Port Operation Regime — Algorithm

Set 2016 - Fev 2017

Creation of the “Port Operation Regime” tool. Simulation of the operation of ships in ports – Tool developed to find the maximum number of ships that a terminal can operate over a year, changing technical and mechanical characteristics of loaders/unloaders. Tool that uses output current fields from the Delft3D hydrodynamic model, based on a conceptual ship model, navigation channel design, vessel propulsion and maneuverability characteristics, configuration of the number of mooring berths, number of mooring areas and operating time of each berth, to calculate the terminal operating fee. Application for ports and port terminals.

Tool to be used in conjunction with 'Navigation Windows' and logistical studies, in order to study the feasibility of a port terminal, regarding the operation of ships and cargo handling.

This tool was developed to study the feasibility of the port terminal in Mearim, MA.

Low cost Tide Gauge — Hardware-Android App

Set 2015 - Dez 2016

Development of a low cost tide gauge (sea level measurement instrument). Android application development to manage the instrument via Bluetooth, enabling:

- on/off;

- receipt of measured data and processing/noise filters;

- synchronization of consolidated data with api.

Delft3D-Part Automations — Algorithm

Fev 2015 - Jun 2015

Numerical modeling of an oil spill for Santos Bay and adjacent oceanic region. Numerical model used (Delft3D PART module). Development of a tool for automating probabilistic oil simulations using the PART-Delft3D module. Prepared for Companhia Docas of the State of São Paulo (CODESP).

Navigation Windows — Algorithm

Abr 2014 - Dez 2014

Creation of the “Navigation Windows” tool. This tool uses current fields from the Delft3D hydrodynamic model, based on a conceptual ship model, navigation channel design, and vessel propulsion and maneuverability characteristics to find possible navigation windows during a given period of time. Application for ports and port terminals.

Delft3D Morphological Analysis Package — Algorithm - GUI

Fev 2014 - Jul 2014

Creation of the "Delft3D Morphological Analysis Package" tool for processing and analyzing morphological data from the Delft3D numerical model. Focus on sediment transport and analysis of beach environments with coastal works (beach nourishment, rigid structures, breakwater). Performs volume calculations and sediment transport rates for each run in Delft3D, allowing sensitivity tests and morphological calibration.

Wave Extreme Analysis Tool — Algorithm - GUI

Jan 2014 - Mai 2014

Creation of the "Extreme Wave Data Analysis" tool for processing and analyzing extreme wave data, using several statistical models to predict Hs and desired return period. Evaluation of historical series of Hs, Tp, Dir, magnitude and wind direction. Based on the history, the payback period is calculated for each selected variable according to different methodologies (USACE, GEV, Weibull, others). The code was built on a graphical interface making it easy for the user and allowing to obtain this type of information in seconds.

XBEACH GUI — Algorithm - GUI

Jul 2013 - Dez 2013

Creation of the "Xbeach GUI" graphical interface of the Xbeach Model (eXtreme Beach Behavior – Delft, Netherlands) to configure the input parameters of the numerical model. It was a graphical interface developed in Matlab during a project at CBI where we used the XBEACH model to simulate extreme event ripples. The motivation was created by the difficulty in understanding and configuring the model. From this, I created a GUI similar to the Delft3D GUI, where it is possible to modify the setup parameters and save the setup file according to the user's choices, besides being able to load a setup and the interface is updated. In addition, a module for viewing the grid and bathymetry of the model in plan was created, and a tool for calculating the shape of the beach in plan according to the parabolic model of Hsu.

Project Link: [gustavo-gomes-ghg/xbeach_gui: Matlab xbeach_gui (github.com)]

Real-time AWAC — Algorithm

Jun 2013 - Ago 2013

Creation of software in a Matlab environment for reading and processing AWAC data (instrument deployed at the aqueous environments that measures waves and currents) in real time, from the Hydrodynamic Forcing Monitoring System in the Tubarão complex, Vitória/ES. The software received binary data through the serial port, converted it to hexadecimal, processed the information, displayed it on the screen and stored it in ASCII files. The connection cable was connected directly from

the instrument to a connection box in a sheltered place where the processing was done.