

Creating Evolduo

A retrospective

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Let's be blunt ... Thessaloniki Java Meetup Group

About me

- Clojurian
- Guitarist
- AI Researcher(?)

About Evolduo

- Platform* for collaborative musical synthesis using evolutionary algorithms
- Open Source and Free to use
- MSc project
- Design phase 3 months
- Impl phase 9* months

About the name

Evoltrio (2010) -> Evolduo (2022) -> ?

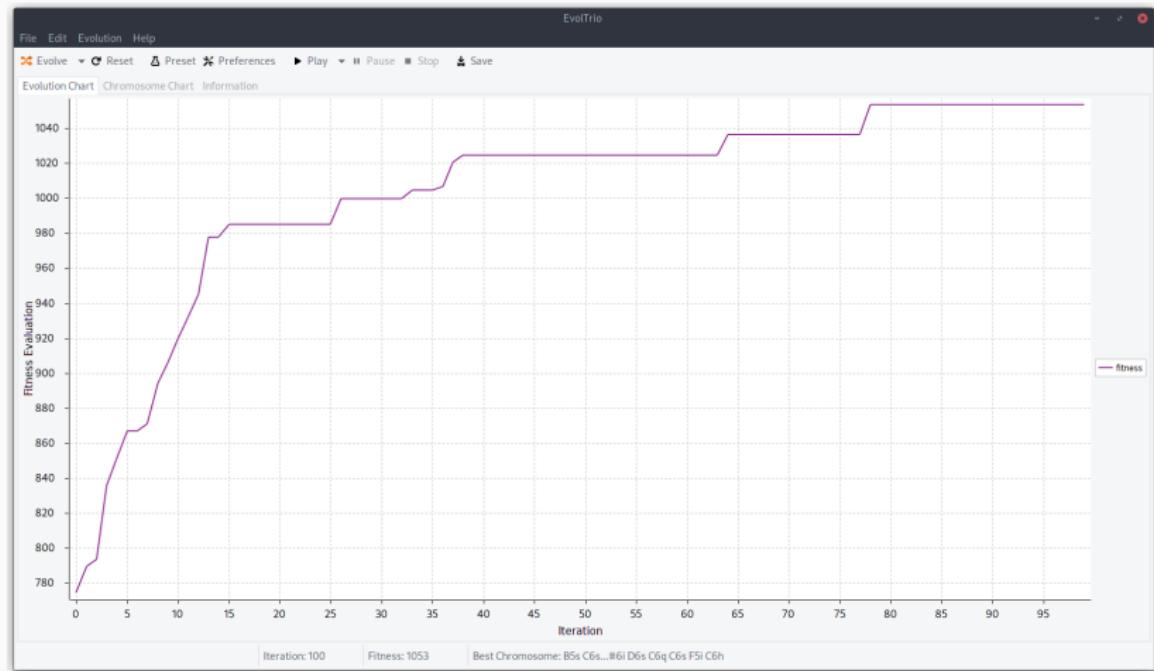


Figure 1: EvolTrio



What this talk is about?

Decision-making

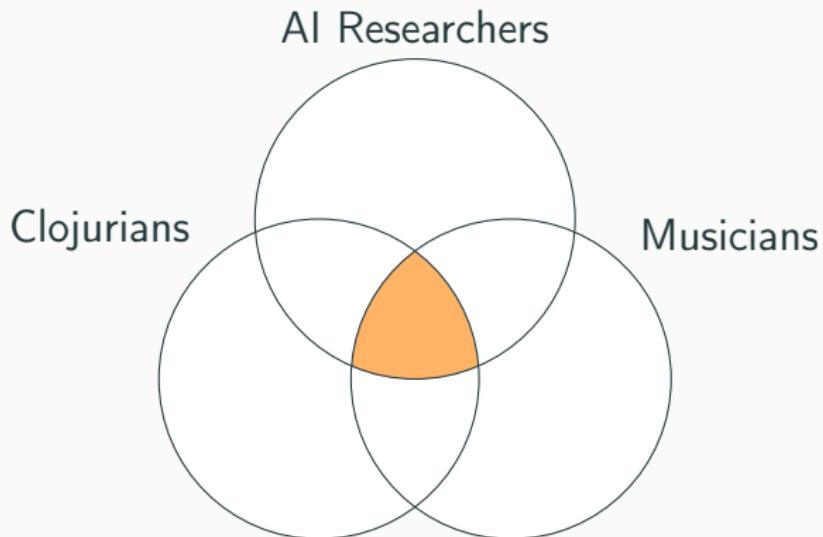
What this talk is not about?

Music, Genetic Algorithms, Clojure

* although it may look like it is

Why not?

Unfortunately



but first...

Demo

Constraints

- Scope (specific)
- Time (not so much)
- Specs (loosly defined)
- Useability (trying to make users able to use it)
- Experimentation (so many options...)

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Modularization

Modules

- User Management
- Musical Synthesis

User Management ...



LED ZEPPELIN

**HOW MANY
MORE TIMES**

Musical Synthesis

- Algorithmic Problem (Plain Clojure)
- Genetic Algorithms
(<https://github.com/kongeor/chickn>)



Figure 2: CHICKN - Am I Cher?

User Management

+

Musical Synthesis

=

?

A man with dark hair and glasses, wearing a yellow and brown leopard-print shirt, is making a surprised or excited expression. His mouth is wide open, and he has his hands raised near his head, fingers spread. The background is plain white.

パイナッポーペン!
(Pineapple pen!)

Options

1. Django + Clojure
 - 1.1 Messaging queue (e.g. RabbitMQ)
 - 1.2 Redis event queue
2. Monolithic (Plain Clojure)

Why not option 1

- Multiple systems are always much harder to maintain
- Mental gear switching when changing ecosystems
- Deployment

Problems with option 2

Just a sec ...

Frameworks

No frameworks?

- No Django, Rails, Spring, Phoenix?
- Why not?
- Modular *frameworks* (e.g. kit)
- Curated set of libraries and tools (e.g. biff)
- DIY

Is this a problem?

- It depends
- Evolduo ~6K LOC
- It's easy to roll your own thing

Hiccup all the things!

```
(defn set-password-form [req & {:keys [password-form
                                         errors]}]

  (base-view
    req
    [:div
      [:h2.is-size-3.mb-4 "Set new password"]
      [:form {:action "/user/set-password" :method "post"}

        [:input {:type "hidden" :name "token"
                 :value (-> req :params :token)}]
        [:div.field
          [:label.label {:for "password"} "Password"]


        ...
```

DB queries

```
(defn find-last-iteration-num-for-evolution
  [db evolution-id]
  (let [q-sqlmap {:select [[:e/id :evolution_id]
                            [:i/id :iteration_id]
                            [:i/num :num]]
                  :from   [[:evolutions :e]]
                  :join   [[:iterations :i]
                            [:= :i/evolution_id :e/id]]
                  :where  [:and
                            [:= :e/id evolution-id]
                            [:= :i/last true]]}]
    (-> (sql/query db (h/format q-sqlmap))
        first
        :num)))
```

Routing

```
(defroutes routes
  (GET "/" [] home-ctl/home)
  (GET "/user/signup" [] user-ctl/signup-form)
  (POST "/user/signup" [] user-ctl/signup)
  ...)
```

DI, systems, etc.

```
(def config
  {:adapter/jetty    {:handler  (ig/ref :handler/run-app)
                      :settings (ig/ref :config/settings)}
   :config/settings {}}
  ...
  )
```

Or is it?

Well you will get something wrong ... maybe you'll forget to lowercase the emails.

Databases

Let's address the elephant in the room

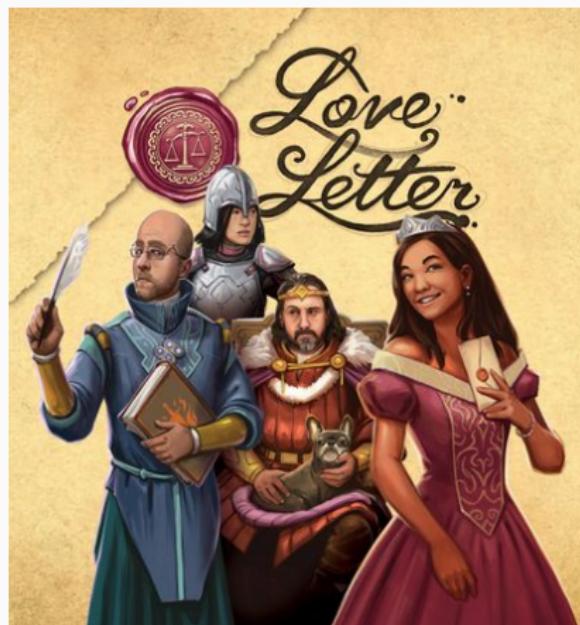


Haha ...

* I'll get my coat



Love letter 1/2



Love letter 2/2

- SQLite
- PostgreSQL

Early transition

SQLite -> PostgreSQL

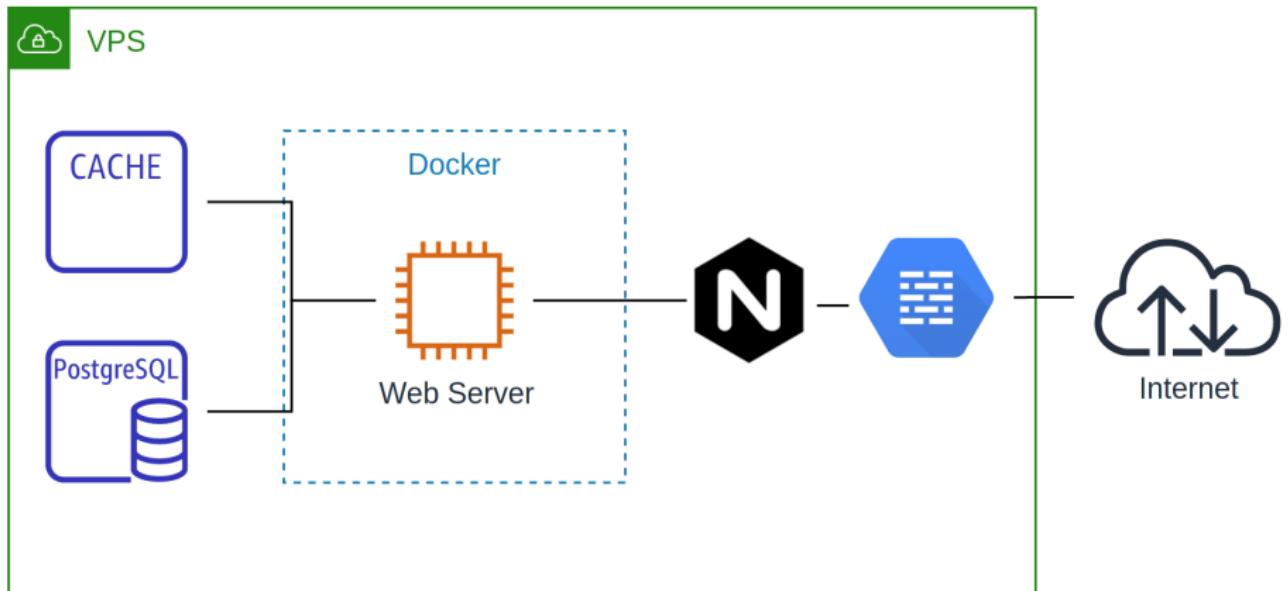
Why?

- Seamless datatype mapping
- More data types
- Easy inspection, via SSH tunneling etc.
- I had it already on my VPS
- Unlikely that it was not the right thing for the job

Infrastructure

What?

- PostgreSQL
- Redis (user sessions)
- Docker (with compose)
- Nginx (reverse proxy, HTTPs via Let's Encrypt)
- Firewall (fail2ban)
- Debian VPS



Deployment

1. Add and push a tag
2. GH action builds a docker image and pushes it to Docker Hub
3. SSH to VPS
4. Bump version to the new tag
5. Reload
6. Restart fail2ban
7. * Let users experience 502 for a bit

(Hidden) Bonus Tracks

Tracks

1. (Getting insane with your) Privacy
 - 1.1 Captcha
 - 1.2 Mails
2. Security
 - 2.1 fail2ban
3. Trust

(Original) Esoteric Captcha

Which four note chord (e.g. CMaj7, Edim7 etc.) is the 4th degree of D dorian?

Mails



Figure 3: A world of pain

Firewall

fail2ban

Trust

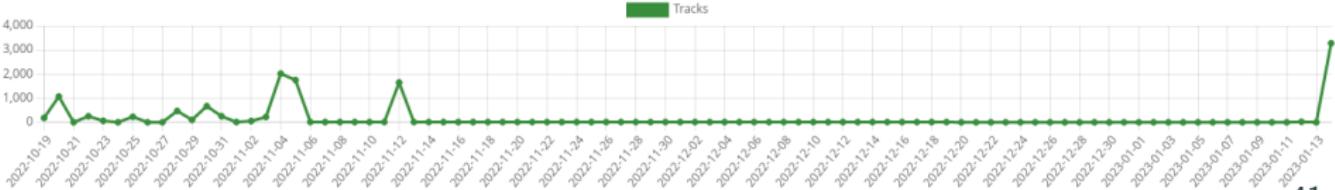
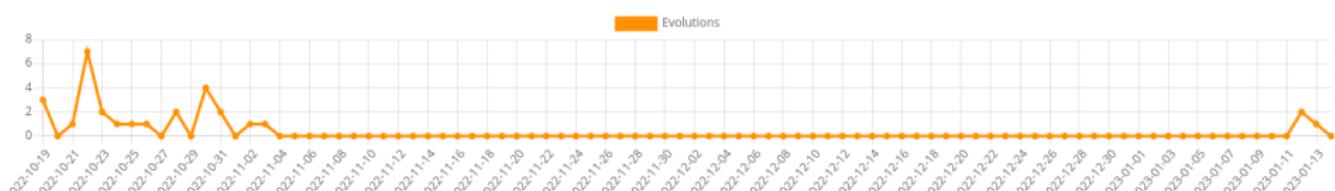
You don't really know what code is being executed

Closing Notes

Be prepared

For disenchantment

Stats



Although

- Some people actually used the app
- Some people actually helped
- 9 people starred it on Github
- 1 person created an issue and said that this was a “Very cool project”
- It’s still great fun to create music
- I *had* to do it

Stats

- 30 registered users
- 18 users created at least one rating
- 20 users created at least one evolution

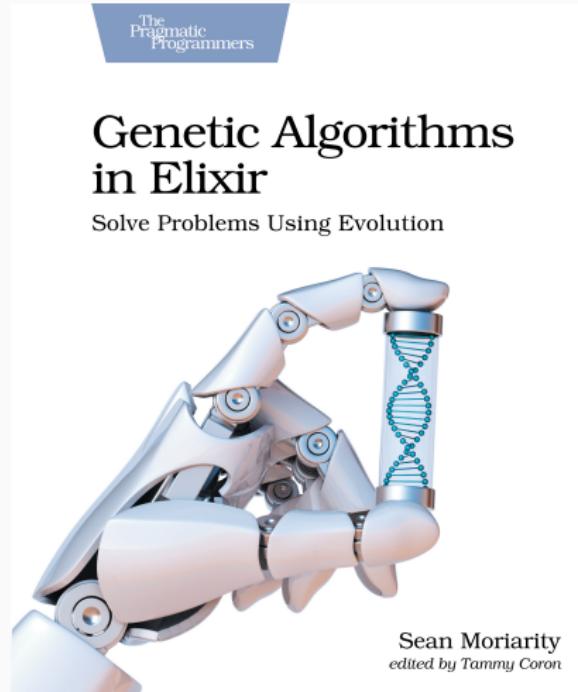
Testimonials

This is surprisingly not terrible.

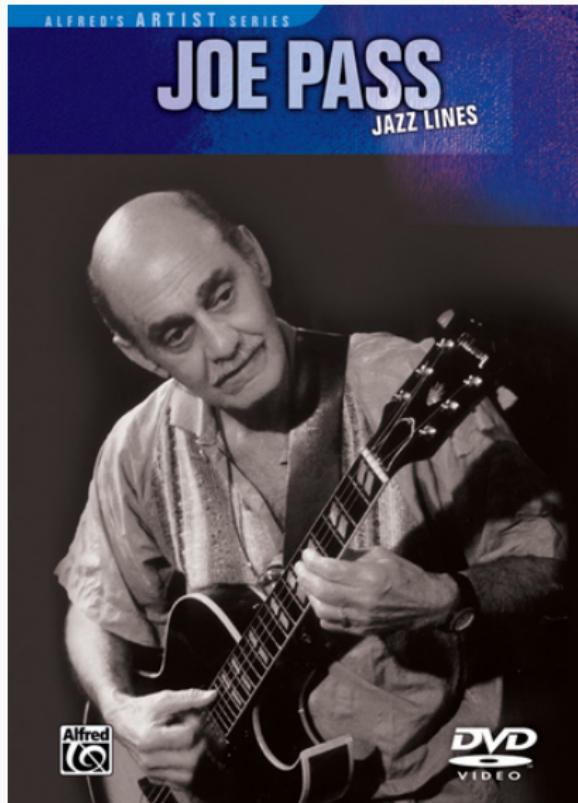
Oh, you have user signup. Then you can sell those emails to [omitted].

Oh, you created a YT video for this. You took it seriously ... although, no one will take this seriously, you have no sponsors.

References 1/4



References 2/4



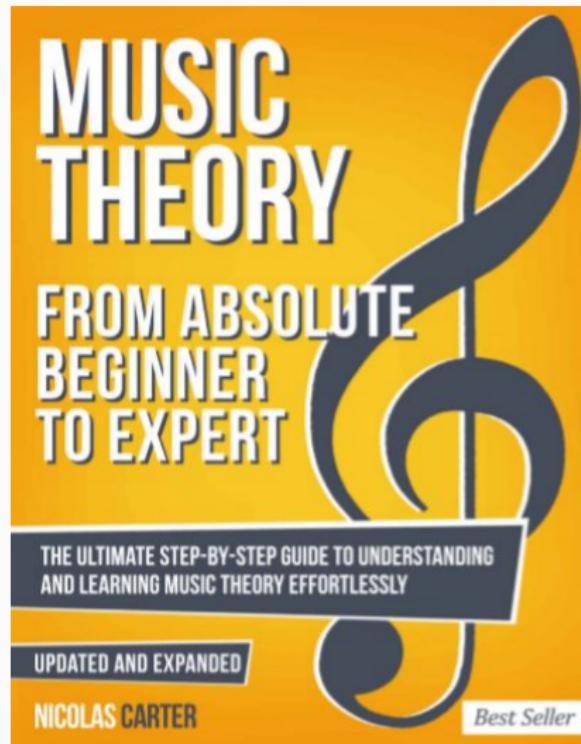
References 3/4

Music Theory

Intermediate Level

December 2005

References 4/4



Inspiration

- John Lennon
- John Fahey
- Kurt Cobain
- Joe Pass

Special Thanks

- Kiki
- P. Adamidis (Supervisor)
- K. Kaloutas (UI/UX)
- A. Krallis (Music Notes)

What's next?

Evolduo Live!

Thank you!

Questions?