MT5 metaquotes algorithmic trading strategy

strategy:

timeframe: 1hour
indicators: ADX and DI results for 1hr timeframe
Stoch RSI results for 15m timeframe
ATR indciator results for 1hr timeframe

every buy, sell, exit signal happens on the close of a 1hr bar, with the actual buy, sell, exit action happening on the open of the next 1hr bar. the only exception is if the stop loss is hit by the price/ticker.

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bullish trend:
DIPlus > DIMinus and ADX >(crosses above) DIMinus (close of 1hr bar)
possibilities for buy trades during this

1st buy trade entry on bullish trend:
DIPlus > DIMinus
and ADX >(crosses above) DIMinus
(close of 1hr bar)

ADX crosses above DIMinus, with DIplus > DIMinus, meaning a buy entry is then triggered on the open of next 1hr bar

stop loss of any buy trade on bullish trend:
based on ATR value

so will use the ATR value from the the close of the 1hr bar that signalled the buy trade, applying the stop loss to the open of next 1hr bar (on the buy entry). stop loss is ATR distance below the entry price, risking 1% of equity per trade, so distance from entry to stop loss (ATR distance) will equal 1% of equity.

exit of any buy trade on bullish trend:
Price/ticker hits stop loss

so whenever price/ticker hits stop loss the trade is closed meaning 1% of equity is lost.

another exit of any buy trade on bullish trend:
ADX <(crosses under) DIMinus

(close of 1hr bar)

so on the close of a 1hr bar ADX crosses below DIMinus, meaning trade is closed on the open of next 1hr bar

another exit of any buy trade on bullish trend:
DIPus <(crosses under) DIMinus
(close of 1hr bar)

so on the close of a 1hr bar DIPlus crosses below DIMinus, the trade is closed on the open of the next 1hr bar

2nd buy trade entry on bullish trend:
Stoch RSI 15m >(crosses above)lower band 20
DIPlus > DIMinus and ADX > DIMinus
(close of 1hr bar)

ONLY applies if 1st buy trade closed due to price hitting stop loss, with the bullish trend continuing (DIPlus > DIMinus and ADX > DIMinus). then on the close of a 1hr bar Stoch Rsi 15m >(crosses above) lower band 20, triggering buy entry on the open of the next 1hr bar.

ALSO Stoch Rsi 15m indicator only uses smoothK

with the Stoch Rsi pinescript indicator provided it is present on 1hr timeframe as you will see, but has results altered for 15m - resulting in indicator repainting. so to deal with this, knowing that only take results from close of 1hr bar, will take Stoch Rsi 15m results from close of -any hour:45minute- bar for metatrader 5.

example to understand better:
for a close of 21.00 1hr bar
21.00 1hr bar closes at 22.00 - ticker moving up and down from 21.00 - 22.00
21.45 15m bar closes at 22.00 - ticker moving up and down from 21.45 - 22.00
so take the stoch rsi 15m results from the close of every hour:45minute bar

all exit options mentioned above are also applied to 2nd buy trade:
DIPus <(crosses below) DIMinus (close of 1hr bar)
or ADX <(crosses below) DIMinus (close of 1hr bar)
or Price/ticker hits stop loss

3rd and 4th buy trade entry on bullish trend:
Stoch Rsi 15m >(crosses above)lower band 20
DIPlus > DIMinus and ADX > DIMinus

(close of 1hr bar)

exactly acts the same as the 2nd buy trade entry, if the 2nd and 3rd buy trades closed due to price hitting stop loss, provided the bullish trend continues (DIPlus > DIMinus and ADX > DIMinus). stoch Rsi 15m >(crosses above) lower band 20 on close of - any hour:45 minute - bar when repainting is not considered and this being the actual data needed for metatrader 5.
however 5th and more buy entries will be ignored on the same bullish trend, max of 4 losses per trend.

all previous buy exit options are the same here too:
DIPus <(crosses below) DIMinus (close of 1hr bar)
or ADX <(crosses below) DIMinus (close of 1hr bar)
or Price/ticker hits stop loss

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bearish trend:
DIMinus > DIPlus and ADX >(crosses above) DIPlus (close of 1hr bar)
possibilities for sell trades during this

1st sell trade entry on bearish trend:
DIMinus > DIPlus
and ADX >(crosses above) DIPlus
(close of 1hr bar)

ADX crosses above DIplus, with DIMinus > DIPlus, meaning a sell entry is then triggered on the open of next 1hr bar

stop loss of any buy trade on bearish trend:
based on ATR value

so will use the ATR value from the the close of the 1hr bar that signalled a sell trade, applying the stop loss to the open of next 1hr bar (on the sell entry). stop loss is ATR distance above the entry price, risking 1% of equity per trade, so distance from entry to stop loss (ATR distance) will equal 1% of equity.

exit of any sell trade on bearish trend:
Price/ticker hits stop loss

so whenever price/ticker hits stop loss the trade is closed meaning 1% of equity is lost.

another exit of any sell trade on bearish trend:

DIMinus > DIPlus
and ADX <(crosses below) DIPlus
(close of 1hr bar)

so on the close of a 1hr bar ADX crosses below DIPlus, while still DIMinus > DIPlus, meaning trade is closed on the open of next 1hr bar

another exit of any buy trade on bearish trend:
DIMinus <(crosses below) DIPlus
(close of 1hr bar)

so on the close of a 1hr bar DIMinus crosses below DIPlus, the trade is closed on the open of the next 1hr bar

2nd buy trade entry on bearish trend:
Stoch Rsi 15m >(crosses under) upper band 800
DIMinus > DIPlus and ADX > DIPlus
(close of 1hr bar)

ONLY applies if 1st buy trade closed due to price hitting stop loss, with the bearish trend continuing (DIMinus > DIPlus and ADX > DIPlus). then on the close of a 1hr bar Stoch Rsi 15m >(crosses under) upper band 80, triggering sell entry on the open of the next 1hr bar.

ALSO Stoch Rsi 15m indicator only uses smoothK

with the Stoch Rsi pinescript indicator provided it is present on 1hr timeframe as you will see, but has results altered for 15m - resulting in indicator repainting. so to deal with this, knowing that only take results from close of 1hr bar, will take Stoch Rsi 15m results from close of -any hour:45minute- bar.

example to understand better:
for a close of 21.00 1hr bar
21.00 1hr bar closes at 22.00 - ticker moving up and down from 21.00 - 22.00
21.45 15m bar closes at 22.00 - ticker moving up and down from 21.45 - 22.00
so take the stoch rsi 15m results from the close of every hour:45minute bar

all exit options mentioned above are also applied to 2nd sell trade:
DIMinus <(crosses below) DIPlus (close of 1hr bar)
or ADX <(crosses below) DIMinus (close of 1hr bar)
or Price/ticker hits stop loss

3rd and 4th sell trade entry on bearish trend:

Stoch Rsi 15m >(crosses under)upper band 80
DIMinus > DIPlus and ADX > DIPlus
(close of 1hr bar)

exactly acts the same as the 2nd sell trade entry, if the 2nd and 3rd sell trades closed due to price hitting stop loss, provided the bearish trend continues (DIMinus > DIPlus and ADX > DIPlus). stoch Rsi 15m >(crosses under) upper band 80 on close of - any hour:45 minute - bar when repainting is not considered and this being the actual data needed for metatrader 5.
however 5th and more sell entries will be ignored on the same bearish trend, max of 4 losses per trend.

all previous sell exit options are the same here too:
DIMinus <(crosses below) DIPlus (close of 1hr bar)
or ADX <(crosses below) DIMinus (close of 1hr bar)
or Price/ticker hits stop loss

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twist-bullish trend:
DIMinus > DIPlus and ADX > DIPlus (close of 1hr bar)
next close of 1hr bar….
DIPlus > DIMinus and ADX > DIMinus
twist-bullish trend starts on open of next 1hr bar

possibilities for buy trades during this
similar to bullish trend just ADX was above a DI already

1st, 2nd, 3rd buy trade entry of twist-bullish trend:
Stoch RSI 15m >(crosses above)lower band 20
DIPlus > DIMinus and ADX > DIMinus
(close of 1hr bar)

as soon as a normal bullish trend was initiated on the close of 1hr bar, a buy entry was always triggered on the open of next bar, not always the case with the twist-bullish trend. no trade is intiated until Stoch Rsi 15m >(crosses above) 20 lower band while DIPlus > DIMinus and ADX > DIMinus. similar to the 2nd 3rd 4th buy trade entries on a normal bullish trend.
again, stoch Rsi 15m >(crosses above) lower band 20 on close of - any hour:45 minute - bar when repainting is not considered and this being the actual data needed for metatrader 5.

however 4th and more buy entries will be ignored, max of 3 losses on the same twist-bullish trend

stop loss of any buy trade on twist-bullish trend:
based on ATR value

so will use the ATR value from the the close of the 1hr bar that triggered the buy entry, applying the stop loss to the open of next 1hr bar (same time as buy entry). stop loss is ATR distance below the entry price, risking 1% of equity per trade, so distance from entry to stop loss (ATR distance) will equal 1% of equity.

all previous buy exit options are the same here too:
DIPus <(crosses below) DIMinus (close of 1hr bar)
or ADX <(crosses below) DIMinus (close of 1hr bar)
or Price/ticker hits stop loss

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twist-bearish trend:
DIPlus > DIMinus and ADX > DIMinus (close of 1hr bar)
next close of 1hr bar….
DIMinus > DIPlus and ADX > DIPlus
twist-bearish trend starts on open of next 1hr bar

possibilities for sell trades during this
similar to bearish trend just ADX was above a DI already

1st, 2nd, 3rd sell trade entry of twist-bullish trend:
Stoch RSI 15m >(crosses under) upper band 80
DIMinus > DIPlus and ADX > DIPlus
(close of 1hr bar)

as soon as a normal bearish trend was initiated on the close of 1hr bar, a sell entry was always triggered on the open of next bar, not always the case with the twist-bearish trend. no trade is intiated until Stoch Rsi 15m >(crosses under) upper band 80 while DIMinus > DIPlus and ADX > DIPlus. similar to the 2nd 3rd 4th buy sell entries on a normal bearish trend.
again, stoch Rsi 15m >(crosses under) upper band 80 on close of - any hour:45 minute - bar when repainting is not considered and this being the actual data needed for metatrader 5.

however 4th and more buy entries will be ignored, max of 3 losses on the same twist-bullish trend

stop loss of any buy trade on twist-bearish trend:
based on ATR value

so will use the ATR value from the the close of the 1hr bar that triggered the buy entry, applying the stop loss to the open of next 1hr bar (same time as buy entry). stop loss is ATR distance below the entry price, risking 1% of equity per trade, so distance from entry to stop loss (ATR distance) will equal 1% of equity.

all previous sell exit options are the same here too:
DIMinus <(crosses below) DIPlus (close of 1hr bar)
or ADX <(crosses below) DIPlus (close of 1hr bar)
or Price/ticker hits stop loss

2ND PART OF CODING only if above if finished and is correct

BID price: actual price
ASK price: actual price + spread

regarding stop losses:
due to spreads need to adjust them in both live and backtesting
regarding entry price and exit price :
automatically adjusted by spreads on live, but will need to adjust for backtesting

sell trades:

stop loss:

for backtesting and live algorithms
adjusting stop loss with spread

after a sell entry is placed, price then moves at the ask price which is higher than the actual price shown. to deal with this, the current spread on the open of the 1hr bar (sell entry)will be added to stop loss length. so when a sell signal happens on the close of a 1hr bar and triggers sell entry on open of next 1hr bar, the spread and ATR value(from the close of the previous 1hr bar) is added together to become the new stop loss distance from entry.

ATR value + spread = actual stop loss distance
bid price + ATR value + spread = new stop loss price

ATR value (at buy signal/ close of previous 1hr bar)
bid price (buy entry/ open of 1hr bar)
current spread (at buy entry/ open at 1hr bar)

for example:

a sell trade is signalled (bearish trend) when
DIMinus > DIPlus
and ADX >(crosses above) DIPlus
(close of 1hr bar)

the spread is 0.35 and the ATR is 9 on the close of 1hr bar (0.35 being 3.5 pips in example, 9 being 90pips)

sell entry happens on open of next 1hr bar with a stop loss distance of 93.5pips above entry, this distance equalling to 1% of equity.

exit price:

for live algorithm
exit price

exit price automatically happens at ask price on live, so wont change it

for backtesting algorithm
adjusting exit price with spread

during the live algorithm, when sell trades exit they automatically exit at the ask price than actual price. to replicate this in backtesting, when an exit signal is triggered on the close of a 1hr bar use the current spread on the open of next 1hr bar, and add it to the exit price.

for example:
ADX <(crosses below) DIMinus (bearish trend)
(close of 1hr bar)

spread is 14 on open of 1hr bar (14 being 14pips in example)

exit happens on open of 1hr bar at a price of 3023.5, exiting at actually 3037.5 by adding 14pips to get realistic sell exit price

buy trades:

stop loss:

for live and backtesting algorithm
adjusting stop loss with spread

since price opens at the ask price for a buy trade, a new stop loss distance needs to be calculated. finding the the actual stop distance by adding the ATR value (from close of bar at buy signal) with the current spread (at open of next bar at buy entry). also the stop loss price stays the same, but the entry price changes, entry price(bid price) + spread = actual entry price(ask price).

ATR value + spread = actual stop loss distance
bid price - ATR value = stop loss price

ATR value (at buy signal/ close of previous 1hr bar)
bid price (buy entry/ open of 1hr bar)
current spread (at buy entry/ open at 1hr bar)

for example:
a buy trade is signalled when
Stoch RSI 15m >(crosses above) lower band 20
and DIPlus > DIMinus and ADX > DIMinus
(close of 1hr bar)

current spread on open of 1hr bar is 1.6 and the ATR is 0.12 on the close of 1hr bar (1.6 being 160pips and 0.12 being 12pips in example)

buy entry happens at ask price, with a stop distance of 172pips equalling to 1% of equity

entry price:

for live algorithm
<u>entry price</u>

entry price automatically opens at ask price when live, so wont change it

for backtesting algorithm
adjusting <u>entry price</u> with spread

in the live version, entry price opens at the ask price. backtesting opens at the bid/normal price, to replicate live version in backtesting will need to add the current spread (open of 1hr bar) to the bid price (entry price without spreads)

spread + bid price = actual buy entry price (ask price)

bid price (buy entry/ open of 1hr bar)
current spread (at buy entry/ open at 1hr bar)

additional things & questions:

max quantity reached:
the quantity calculated to be used per trade is based on the stop loss distance which equals to 1% risk of equity, but if the quantity calculated ends up being higher than the max quantity offered by the broker per trade, then have the quantity equal to the max. will the quanity limit number need to be applied into the algorithm for each cfd pair?

cfd pairs being traded:
ability to have the algorithm trade with multiple cfd pairs at once, with an option to add more pairs or delete some.

ability for me to change certain things in the algorithm if wanted to
including:

- the stop loss equity, currently at 1% risk but where to change if i wanted 2% risk or more per trade
- the max number of losses per trend if wanted to change , for both bullish/bearish and twist-bullish/twist-bearish trends
- the timeframes, currently at 1hr timeframe with 15m Stoch RSI (taking hour:hour+45mins close). if wanted to change main timeframe to 15m and have 3m Stoch RSI (ratio of 15m and 3m close bars being 15m:15m+12mins close). for example: 15m bar at 12:00 close at 12:15 -ticker moves up and down from 12:00 to 12:15
  3m bar at 12:12 close at 12:15 -ticker moves up and down from 12:12 to 12:15
  as these close at the same time as each other, fixing the repainting problem once again.
- where can I turn off twist-bullish and twist-bearish trends

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indicators on pinescript:

ADX indicator

```
//@version=4

study("ADX and DI for v4")
len = input(20)
th = input(40)
```

```
TrueRange = max(max(high-low, abs(high-nz(close[1]))), abs(low-nz(close[1])))
DirectionalMovementPlus = high-nz(high[1]) > nz(low[1])-low ? max(high-nz(high[1]), 0): 0
DirectionalMovementMinus = nz(low[1])-low > high-nz(high[1]) ? max(nz(low[1])-low, 0): 0

SmoothedTrueRange = 0.0
SmoothedTrueRange := nz(SmoothedTrueRange[1]) - (nz(SmoothedTrueRange[1])/len) + TrueRange

SmoothedDirectionalMovementPlus = 0.0
SmoothedDirectionalMovementPlus := nz(SmoothedDirectionalMovementPlus[1]) - (nz(SmoothedDirectionalMovementPlus[1])/len) + DirectionalMovementPlus

SmoothedDirectionalMovementMinus = 0.0
SmoothedDirectionalMovementMinus := nz(SmoothedDirectionalMovementMinus[1]) - (nz(SmoothedDirectionalMovementMinus[1])/len) + DirectionalMovementMinus

DIPlus = SmoothedDirectionalMovementPlus / SmoothedTrueRange * 100
DIMinus = SmoothedDirectionalMovementMinus / SmoothedTrueRange * 100
DX = abs(DIPlus-DIMinus) / (DIPlus+DIMinus)*100
ADX = sma(DX, len)

plot(DIPlus, color=color.green, title="DI+")
plot(DIMinus, color=color.red, title="DI-")
plot(ADX, color=color.blue, title="ADX")
hline(th, color=color.black)
```

Stoch RSI K 15m indicator

made for 15m specifically so re painting on 1hr chart but used to show strategy

```
//@version=5
indicator(title="Stochastic RSI K", shorttitle="Stoch RSI K 15m", format=format.price, precision=2, timeframe="15", timeframe_gaps=true)
smoothK = input.int(3, "K", minval=1)
lengthRSI = input.int(14, "RSI Length", minval=1)
lengthStoch = input.int(14, "Stochastic Length", minval=1)
src = input(close, title="RSI Source")
rsi1 = ta.rsi(src, lengthRSI)
k = ta.sma(ta.stoch(rsi1, rsi1, rsi1, lengthStoch), smoothK)
```

```
plot(k, "K", color=#2962FF)
h0 = hline(80, "Upper Band", color=#787B86)
hline(50, "Middle Band", color=color.new(#787B86, 50))
h1 = hline(20, "Lower Band", color=#787B86)
fill(h0, h1, color=color.rgb(33, 150, 243, 90), title="Background")
```

ATR indciator

```
//@version=5

indicator(title="Average True Range", shorttitle="ATR", overlay=false, timeframe="",
timeframe_gaps=true)
length = input.int(title="Length", defval=14, minval=1)
smoothing = input.string(title="Smoothing", defval="RMA", options=["RMA", "SMA",
"EMA", "WMA"])
ma_function(source, length) =>
switch smoothing
"RMA" => ta.rma(source, length)
"SMA" => ta.sma(source, length)

"EMA" => ta.ema(source, length)
=> ta.wma(source, length)
plot(ma_function(ta.tr(true), length), title = "ATR", color=color.new(#B71C1C, 0))
```
